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STANFORD'S COMPENDIUM

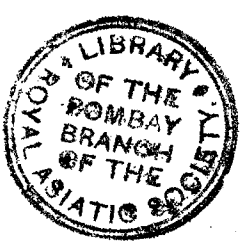
OF

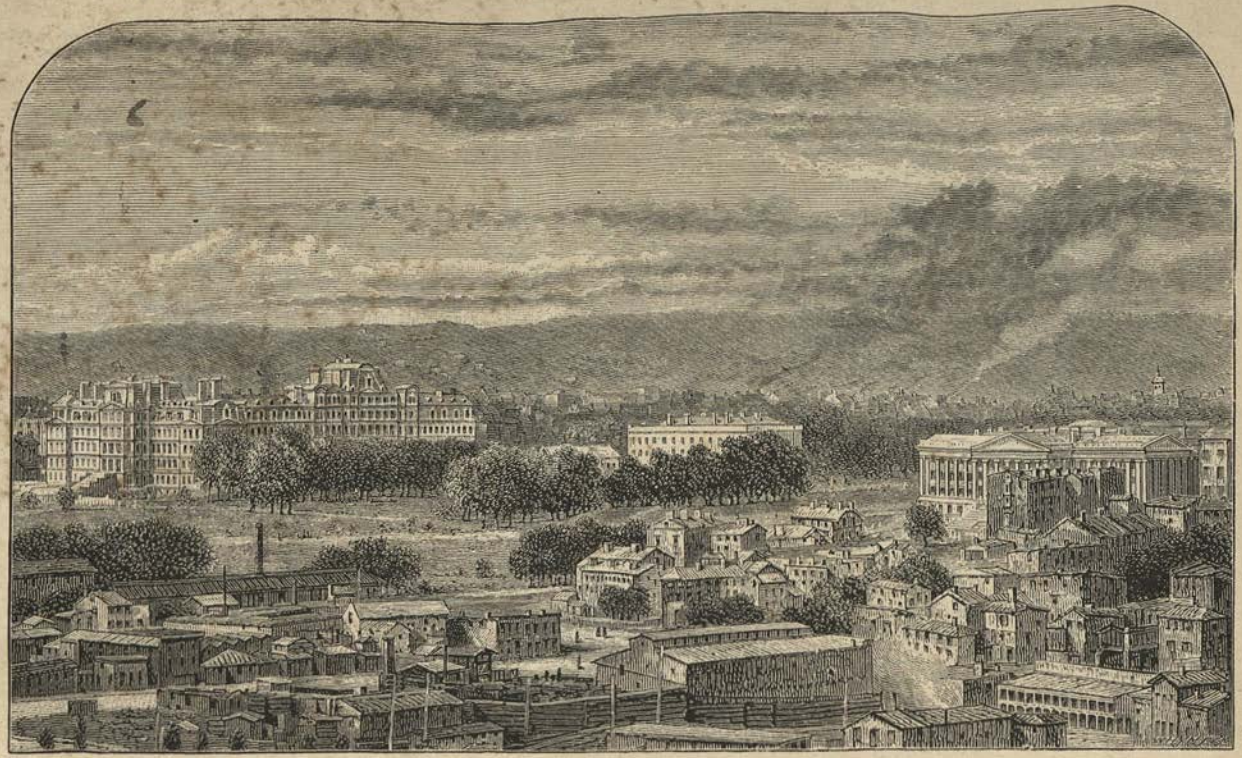
GEOGRAPHY AND TRAVEL

FOR GENERAL READING

BASED ON HELLWALD'S 'DIE ERDE UND IHRE VÖLKER'

TRANSLATED BY A. H. KEANE, M.A.I.





WASHINGTON. *Frontispiece.*

STANFORD'S

COMPENDIUM OF GEOGRAPHY AND TRAVEL

BASED ON HELLWALD'S 'DIE ERDE UND IHRE VÖLKER.'

NORTH AMERICA

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EDITED AND ENLARGED BY

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W. C-38

MAPS AND ILLUSTRATIONS

LONDON

EDWARD STANFORD, 55, CHARING CROSS, S.W.

1883

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PREFACE.

THE present volume of the Compendium of Geography and Travel will, it is hoped, be found a not unworthy companion to the volumes that have preceded it.

In common with the series, it is primarily based upon Mr. Keane's translation of Von Hellwald's *Die Erde und ihre Völker;* but the considerable alterations and additions which have been deemed desirable make it, to all intents and purposes, a new and original work.

The complete volume was originally undertaken by Professor Hayden, then Chief of the United States Geological Survey; but on the receipt of his MS. it was considered, both by him and myself, better that the British American portion should be edited by some gentleman resident in the Canadian Dominion, and whose knowledge and predilection for the Dominion were quite equal to Professor Hayden's for the United States.

Professor Selwyn, F.R.S., the head of the Geological Survey of Canada, kindly acceded to my request that he would undertake that portion of the volume; and I have endeavoured to supply such maps and other illus-

trations as would form suitable companions to their joint labours.

I have not thought it requisite to reprint Mr. Keane's valuable Ethnological Appendix, which will be found in the volume on South America.

E. S.

April 6, 1883.

CONTENTS.

PART I.

NORTH AMERICA.

CHAPTER I.

THE COASTS.

PAGE

General view of the Continent—The Gulf Coast—The Eastern Coast—The Pacific Coast—The shores of the Arctic Ocean . 1

CHAPTER II.

THE APPALACHIAN MOUNTAIN SYSTEM.

General features—General geographical structure—White Mountains—Green Mountains—The Adirondacks—The Alleghanies in Pennsylvania—The Black Mountains of North Carolina—Vegetation of the Appalachian ranges—Geology of the Appalachian region—Mineral resources of the Appalachian region—The Appalachian coal-fields—The petroleum districts . . . 5

CHAPTER III.

THE MISSISSIPPI VALLEY.

Extent—General features—Lake Itasca—Course of the Mississippi—Secondary tributaries of the Mississippi—The Mississippi Basin—The Prairies—Geology of the Mississippi Valley—Mineral resources of the Mississippi Valley—Coal-fields of the Mississippi Valley—Iron—Lead—The salt-mines of Louisiana—The Great Lakes and the St. Lawrence River—Lake Superior—Lake Huron—Lake Michigan—Niagara River and Falls—Geology of the region of the Great Lakes 20

CHAPTER IV.

The Cordilleran Plateau.

PAGE

General geographical features—Climate of the Cordilleran Plateau—Natural vegetation of the Cordilleran Plateau 40

CHAPTER V.

The Great Plains.

Their physical aspect—The Llano Estacado—The Plains in British America—Bad lands—Vegetation—The Fauna—The buffalo—Geology of the Great Plains 47

CHAPTER VI.

The Rocky Mountains.

General divisions of the Cordillera system—The northern section of the Rocky Mountains in the United States—The Yellowstone National Park—Geysers and hot springs—The White Mountain Springs—The Geyser Basin on the Firehole River—Old Faithful—The Beehive—Giantess—Castle—Grand Geyser—Turban Geyser—Giant Geyser—Grotto Geyser—Lower Geyser Basin—The Shoshone Geyser Basin—The Minute Man—Red Mountain Springs—Gibbon Geysers—The Grand Cañon and Falls of the Yellowstone—The Missouri Valley—The Grand Falls of the Missouri—The Wind River and Yellowstone Ranges—Snake River—The Snake River Plains—The Big Horn Mountains—The Continental Watershed from South to Bridger's Pass—The southern section of the Rocky Mountains—The Colorado or Front Range—The Sangre de Cristo Range—The Parks—North Park—The Laramie Plains—Middle Park—South Park—The San Luis Valley—The Park Range—The Sawatch and Elk Ranges—The San Juan Range—The Continental Divide . 57

CHAPTER VII.

The Plateau Region of the Colorado River.

General view—The Cañons of the Colorado and Green—Running a rapid—Fauna and Flora of the Plateau Region 92

CHAPTER VIII.

The Great Basin.

PAGE

Its general appearance—The Wahsatch Range—The Basin Ranges—Great Salt Lake—Death Valley 103

CHAPTER IX.

The Pacific Ranges.

In general—The Cascade Range—Results of the latest surveys—Mount Rainier—Glaciers—Mount Shasta—The Sierra Nevada—The Yosemite Valley—The Coast Ranges—The Sacramento and San Joaquin Valley—The vegetation of the Sierra—The "Big Trees"—Agricultural resources of the Cordilleran Region . 110

CHAPTER X.

Geology of the Cordilleran Plateau.

General review—Rocky Mountains—The Plateau Region—The Basin Region—The Sierra Nevada, Coast, and Cascade Ranges—Mineral resources of the Cordilleras—Gold—Methods of gold mining—Silver—The Comstock lode and Virginia City—Utah, Idaho, and Colorado—Leadville, Colorado—Coal . . . 127

CHAPTER XI.

Historical Survey.

General discovery and first settlement—Rise of the English and French settlements—Spread of the English power—Democratic and religious character of the early English settlements—Political enfranchisement and adoption of Republican principles—Federal Union—Progress of events—Spread of the Union to the Pacific—The Civil War—Its causes and results—Reconstruction of the Union 162

CHAPTER XII.

Extent and Population.

Boundaries and extent—Population—Distribution of the population—American cities—New York City—Philadelphia—Baltimore, the Monumental City—Washington—Buffalo, Cleveland, Detroit, Pittsburg, Cincinnati—St. Louis and Chicago—San Francisco . 179

CHAPTER XIII.

The Population and its Various Elements.

PAGE

Statistics of the native and foreign elements—Native Americans—The German element—The Irish element—The Whites of the Southern States—The Negro—The Chinese in the States—Their good qualities—Degraded habits and vices of the Celestials—Social state of the Californian Chinese—The Japanese in California 203

CHAPTER XIV.

The Indians.

Statistics of the settled and nomad tribes—Pueblos—Moquis—The nomadic tribes—Characteristic traits of the Indian—Are the Indians dying out?—The predatory tribes of the West—Indian Territory—Half-breeds—The unwritten history of America—The Mound-Builders—Ruins in the South-Western Territories . 218

CHAPTER XV.

Social Relations.

Classes of society—Public instruction—The schools—Defects of the system—Colleges and universities—Sectarian spirit of the private scholastic foundations 239

CHAPTER XVI.

Religion.

The Christian religion—Eccentric forms of religious development—The Shakers: their history and constitution—The Inspirationist, Perfectionist, etc.—The Jehovah People—Mormonism—Joseph Smith—"The Book of Mormon"—Nauvoo—Brigham Young, "The Lion of the Lord"—Deseret—Polygamy—Constitution of Mormonism—Schism—Prospects 246

CHAPTER XVII.

Material Progress.

Agriculture—Maize, oats, potatoes, etc.—Wine and tobacco—The plantations—Cotton and sugar—Cattle-breeding—Farm stock—Timber—Reckless destruction of the forest—Hunting and fishing—Manufactures—Mercantile interests—Decline of the American carrying trade—Inland trade—Railways and canals—National wealth and liabilities 261

CHAPTER XVIII.

POLITICAL ADMINISTRATION.

PAGE

The Federal Constitution—Congress—The Executive—The President—The Judiciary—Constitution of the States and Territories—The Cabinet—Revenue and expenditure—Land and sea forces . 270

CHAPTER XIX.

THE TERRITORY OF ALASKA.

Physical aspect of the country—Inhabitants—Indians—Eskimos—Agricultural prospects—Natural resources—The fur trade—Geology and mineral resources 276

PART II.

THE DOMINION OF CANADA AND NEWFOUNDLAND.

CHAPTER I.

THE COASTS.

Boundaries and area—The Atlantic Coast—The shores of Hudson Bay—The Arctic Coast—The Pacific Coast—Queen Charlotte Islands 289

CHAPTER II.

THE MOUNTAINS.

General features—The Acadian Highlands—The Shickshock, Notre Dame, and Laurentide Mountains—Rocky Mountains—The Cascades, Coast, and Gold Ranges of British Columbia . . 328

CHAPTER III.

THE RIVERS AND LAKES.

General features and extent—The River St. Lawrence—Tributaries of the St. Lawrence—Lake Ontario—Lake Erie—Lake Huron and Georgian Bay—Lake Superior—Lake Nipigon . . . 344

CHAPTER IV.

The Basin of Hudson Bay.

PAGE

General features—The Saskatchewan River—The north branch of the Saskatchewan—The Nelson River—The lower part of Nelson River—Lake Winnipeg—Lakes Manitoba and Winnipegosis—The Winnipeg River—The character of the country about the Upper Winnipeg—The Red River—The Lake of the Woods—The Beaver or Churchill River 377

CHAPTER V.

The Basin of the Mackenzie River and its Tributaries.

General view—The Peace River—The Du Liard River, or River of the Mountains—The Hay River 426

CHAPTER VI.

The Western Slopes of the Rocky Mountains and the Rivers and Lakes of British Columbia.

General view—The Columbia River—The Fraser River—The Lakes . 437

CHAPTER VII.

Climate and Vegetation.

General review—Climate of North-West Territories and British Columbia—The forest—The grasses—Fruit-growing . . 453

CHAPTER VIII.

Mines and Minerals.

British Columbia—Ontario—Salt—Gypsum—Silver—Copper—Iron ore—Quebec—New Brunswick—Nova Scotia . . . 501

CHAPTER IX.

Canals and Railways.

Railways—Postal systems—Telegraphs 510

CHAPTER X.

Manufactures.

Trade, Commerce, etc.—Fisheries 527

CHAPTER XI.

The People.

PAGE

Numbers—Physique of the people—Military position and militia—Visitors—Artists—Attractions for sportsmen . . . 535

CHAPTER XII.

Indians and Indian Treaties.

General View—Indian missions—Games—The Métis or Mixed races . 557

CHAPTER XIII.

Immigration and Settlement 576

CHAPTER XIV.

Cities of the Dominion.

Halifax (Nova Scotia)—Fredericton (New Brunswick)—St. John (New Brunswick)—Charlottetown (Prince Edward Island)—Quebec (Quebec)—Montreal (Quebec)—Ottawa (Ontario)—Kingston (Ontario)—Toronto (Ontario)—Winnipeg (Manitoba)—Victoria (British Columbia)—New Westminster (British Columbia) 581

CHAPTER XV.

Constitutional History, Religion, Education, etc.

General outline—Discovery and early history—History of the Federal Union—"Dominion of Canada" Proclamation . . . 604

CHAPTER XVI.

Education 621

CHAPTER XVII.

Newfoundland.

Geology of Newfoundland—Agricultural capabilities—Railway across the island—The fisheries and the treaties—Exports . . 625

Index 637

LIST OF MAPS.

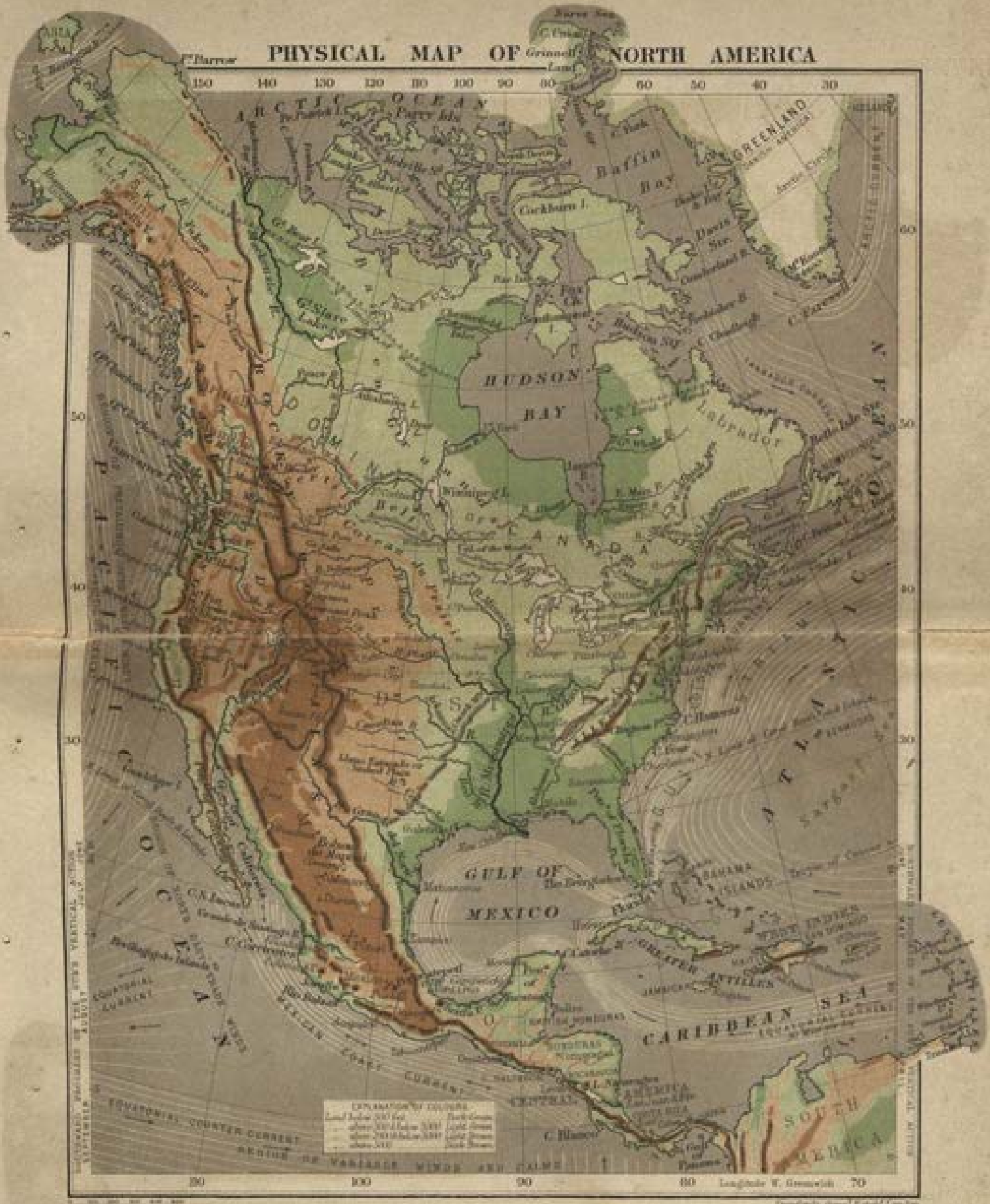
Physical North America	*To face page*		1
National Park	,,	,,	59
Geological United States	,,	,,	160
Political Eastern United States	,,	,,	169
,, Western ,,	,,	,,	170
Population	,,	,,	180
Rainfall	,,	,,	261
Temperature—Greatest Cold	,,	,,	286
,, ,, Heat	,,	,,	287
Dominion of Canada	,,	,,	289
Manitoba: Thunder Bay to Winnipeg	,,	,,	416
British Columbia and the Saskatchewan Territories	,,	,,	437
Railway Map of the Dominion of Canada and the Northern Part of the United States	,,	,,	512
Route Map, Europe to Manitoba and the North-West	,,	,,	522
Canada: Quebec, Ontario, New Brunswick, Nova Scotia, Prince Edward Island	,,	,,	580
Newfoundland	,,	,,	625

LIST OF ILLUSTRATIONS.

Washington	*Frontispiece.*
Mississippi Shore	*Page* 20
The Rapids at Niagara	,, 35
On the Colorado River	,, 41
Buffalo-hunting	*To face page* 52
Prairie Dog Village	,, ,, 54
The Rocky Mountains	*Page* 57
Yellowstone National Park	,, 60
Hot Springs, Yellowstone Valley	,, 61
Geyser in the Yellowstone National Park	,, 62
Beehive Geyser	*To face page* 65
Upper Falls, Yellowstone River	*Page* 73
The Great Salt Lake, Utah	,, 106
The Cascade Mountains	,, 110
Mount Shasta	,, 114
Yosemite Valley, California	,, 118
Giant Trees	,, 123
The Aravaypa Cañon in Arizona	,, 129
View of the Sierra Nevada	,, 133
Chinese Gold-washer	,, 144
Hydraulic Gold-digging	,, 146
New York City	*To face page* 183
,, Broadway	*Page* 184
St. Louis	,, 197
San Francisco	*To face page* 199
,, The Chinese Quarter	*Page* 214
Emigrants attacked by Indians	,, 229
Utah, with the Mormons' Tabernacle	,, 253

Baptism of a (new) Mormon Convert . . . *Page* 256
Otter-hunt in the Aleutian Islands . . . ,, 280
Yale, on the Fraser River (British Columbia) . *To face page* 341
Junction of the Ottawa and the St. Lawrence . ,, ,, 351
Falls of Niagara . . . . . ,, ,, 353
Niagara . . . . . *Page* 355
A Winter Hut in the Saskatchewan Country . *To face page* 384
Valley of the Thompson . . . . . *Page* 442
On the Yukon . . . . . ,, 452
Petrolia . . . . . ,, 503
Labrador Marten . . . . . ,, 551
Reindeer . . . . . *To face page* 553
Indian Sledge . . . . . *Page* 557
Indian Wigwam . . . . . ,, 575
Halifax (Nova Scotia) . . . . *To face page* 581
Quebec . . . . . ,, ,, 585
Montreal . . . . . ,, ,, 587
University College, Toronto . . . ,, ,, 624
New Westminster (British Columbia) . . ,, ,, 602
Newfoundland Dog . . . . . *Page* 636

PHYSICAL MAP OF NORTH AMERICA


ARCTIC OCEAN
Barrow Pt.
Point Barrow
Grinnell Land
Parry Isls.
Melville I.
Banks Land
Cornwallis I.
Baffin Bay
GREENLAND
Davis Str.
Cumberland P.
Cape Farewell
Cape York
Melville Pen.
Boothia Pen.
Cape Chidley
Resolution I.
Southampton I.
Baffins Land
Cockburn I.
Great Bear Lake
Great Slave Lake
Athabasca L.
Winnipeg L.
HUDSON BAY
Labrador
Lake Superior
Lake Michigan
Lake Huron
Lake Erie
Lake Ontario
Lake Winnipeg
Lake Manitoba
Lake Athabasca
Lake Winnipegosis
Lake Michigan
Lake Superior
Lake Ontario
Lake Erie
Lake Huron

NORTH AMERICA.

CHAPTER I.

THE COASTS.

1. *General View of the Continent.*

NORTH AMERICA has, in common with very many of the land features of the earth, a roughly triangular shape, with the base near its northern line, and its acutest angle stretching towards the south. Its northern shores are covered by the perpetual ice and snow of the polar regions, while its southern extremity is dressed in the rich profusion of the tropics.

Politically, it contains several divisions, the central and most populous of which is the United States. North of this, and occupying very nearly the same area, are the British Possessions; while north-west of the latter is Alaska, recently sold by the Russians to the United States.

South of the United States is the uneasy republic of Mexico, occupying the greatly diminished breadth of the continent; Yucatan, occupying the peninsula of the same name; Guatemala, Honduras, and other small principalities.

In this work we shall confine ourselves to a description of the two first-mentioned countries, Mexico and the smaller states south of it having been already described in the work on Central and South America.

The United States, then, while bounded on the west and east by the Pacific and Atlantic Oceans respectively, is limited on the north by the British Possessions, and on the south by the Gulf of Mexico, and by the north boundary of Mexico. This line follows up the Rio Grande del Norte to El Paso, whence it takes a general westward course to the Pacific, following certain parallels of latitude or certain arbitrary directions without regard to the natural features of the country.

The main physical features of this part of North America are very simple. There are two great meridional systems of uplift; that of the Appalachians, near the Atlantic coast, and the vastly greater one of the Cordilleras, which occupies an enormous breadth, in the western part of the country. Between the two is a broad basin, that of the Mississippi Valley and the Great Lakes.

The area of the United States, including Alaska, is 3,580,242 square miles.[1]

2. *The Gulf Coast.*

The Gulf of Mexico washes the southern shores of the United States, from longitude 81° to 97° west of Greenwich. The general trend of the coast-line is east and west, turning sharply to the south at the east and west sides of the Gulf. It is comparatively simple, being but slightly cut by bays and other indentations. It is a tropic coast throughout. It is low, and in very many places marshy. It has many long, narrow islands, lying parallel with the general coast-line, behind which are lagoons—narrow bays parallel to the coast—opening, in some cases, into other bays, which extend some distance inland, making fine and well-protected, but shallow harbours. Most of the rivers discharging into the Gulf have formed sand-bars across their mouths; and several of

[1] The area of the great lakes is not included in this statement.

the streams, notably the Mississippi, have built up deltas about their points of discharge.

3. *The Eastern Coast.*

The eastern seaboard has, on the whole, a straight course, inclining a little to the north-east. Within the United States its general course is but slightly broken by projections and indentations. The great peninsula of Florida, mainly the work of the coral polypes, projects southward, partially separating the Atlantic from the Gulf of Mexico. Thence north to the southern limit of Virginia the coast greatly resembles that of the Gulf in its low-lying shores, its lagoons, and lagoon-islands. In this section Albemarle and Pamlico Sounds are the principal inlets, and Capes Fear and Hatteras, the "stormy cape," almost the only projections.

As we proceed northward the coast becomes bolder and more broken. The harbours are deeper, and the bars at their entrances diminish and then disappear. Here are the great bays of Delaware and Chesapeake, and, farther north, Long Island Sound, separating Long Island from the State of Connecticut, the beautiful Narraganset Bay, and Massachusetts Bay, on whose shores the Puritan pilgrims found a resting-place.

4. *The Pacific Coast.*

The west coast of North America is much less varied than the eastern coast. The whole western seaboard of the United States, from the insignificant little bay of San Diego on the south, northwards to Washington Territory, presents nothing save a few small inlets and islands to vary its uniformity. The Bay of San Francisco only, under the 38th parallel, penetrates to any extent inland, and forms one of the finest harbours on the continent.

But north of the boundary line between the States and the British Possessions the features of the coast-line become more interesting. At the boundary itself lies the island of Vancouver, separated from the mainland by the Straits of Juan de Fuca, Georgia and Queen Charlotte's Sound.

Thence northward there is a line of islands along the coast of British Columbia and Alaska, and, from the extremity of the peninsula of the latter, an almost continuous line stretches across to the coast of Kamtchatka. At the southern boundary of British Columbia there begins a peculiar fiord-like formation, strikingly recalling the features of the Norwegian coast. Nor is it the coast of the mainland alone that is so indented; also, though to a less extent, are the numerous islands lying off the coast, including Vancouver, Queen Charlotte, Prince of Wales, Sitka or New Archangel, and Kodiak, off the Alaskan Peninsula.

In latitude 67° the American coast approaches very close to that of Asia, a space of only 32 miles separating them. This strait, first discovered in 1728 by a Cossack voyager, was, in 1808, carefully explored by Bering, after whom it has been named. It connects the Pacific Ocean with the Arctic, to whose coasts we next turn.

5. *The Shores of the Arctic Ocean.*

These inhospitable regions are little known, as this frozen land is seldom visited by white men.

This shore trends very nearly east and west, and lies approximately on the 70th parallel of north latitude. In its western part it is simple, but farther east it becomes cut deeply by bays, and off the shore are many and very large islands. Hudson's Bay, the great inland sea already mentioned, connects, through Fox's Channel, Hecla and Fury Strait and the Gulf of Boothia with the Arctic Ocean.

CHAPTER II.

THE APPALACHIAN MOUNTAIN SYSTEM.

1. *General Features.*

THIS is the easternmost of the two great systems of uplift of the continent. In magnitude and in height it is far inferior to the Western or Cordillera system.

Its general trend is parallel to the coast—that is, a few degrees east of north, and the numerous parallel ranges and ridges which are its component parts conform to the general trend of the system.

Subordinate to the ranges is a general rise of the surface, which at the north is noticeable quite near the coast, but which retreats from it as we trace it southward. This plateau extends some distance west of the range, forming the highlands of Ohio, Kentucky, and Tennessee, where it has an elevation of nearly 2000 feet above the sea.

2. *General Geographical Structure.*

The structure of the ranges which make up this system is as varied as are the formations composing them, which range from the Archæan to the Carboniferous. They have been subjected to repeated subsidences and uplifts, resulting in a complicated system of flexures, foldings, and fractures, causing vertical displacements of strata of more than 10,000 feet. And they have subse-

quently been so eroded into peaks, hedges, and valleys, that little of their original form is left.

Throughout its extent this system is divided into two parts by a great valley, which follows the trend of the system. This has been named by Prof. Guyot the Great Appalachian Valley. In New York and Canada it is occupied by the Hudson River, Lake Champlain, and the valley of the St. Lawrence. In Pennsylvania it is known as the Cumberland Valley; in Virginia, the Shenandoah Valley; and in Tennessee, the valley of East Tennessee. Its width ranges from 15 to 50 or 60 miles.

3. *White Mountains.*

That part of the Appalachian system included in New Hampshire is known as the White Mountains. These are in the form of a group, nearly isolated from the rest of the system. Its peaks range from 4000 to 6000 feet in height, while the highest, Mount Washington, reaches 6288 feet above the sea. These mountains are a very popular resort for pleasure-seekers during the summer season.

4. *Green Mountains.*

The ranges of Vermont are known as the Green Mountains. They consist mainly of two nearly parallel ridges, only occasionally broken into peaks. They are not as high as the White Mountains by fully a thousand feet. They continue into Canada, where they are known as the Notre-Dame Mountains.

5. *The Adirondacks.*

In northern New York is the group of the Adirondacks, at present one of the most popular of the mountain

resorts in the east. The culminating peak of this group, Mount Tahaurus or Marcy, is 5379 feet above the sea.

The highlands of the Hudson and the Catskills of south-eastern New York are also members of this system.

6. *The Alleghanies in Pennsylvania.*

In Pennsylvania the system is represented by a number of ridges of no great elevation. Though topographically of little importance, their economic value is enormous, for, hidden in the recesses of these minor mountain ridges are the vast stores of anthracite and bituminous coal which have played so great a part in making this country what it is; and great wells of petroleum, which needed only that a Moses should smite the rock to burst forth; and, with these, enormous deposits of iron ore.

Farther southward the ridges increase in altitude. The Blue Ridge, which is the eastern of the ranges throughout Virginia and North Carolina, rises from about 3000 feet in the former state to more than 5000 feet in the latter.

7. *The Black Mountains of North Carolina.*

The culminating region of the southern section consists, according to Professor Guyot, of the Black Mountains, the Great Balsam Mountains, and the Great Smoky Mountains. These are in North Carolina and Eastern Tennessee. The summits range from 5000 to 6700 feet; the highest are Mitchell's Peak, Clingman Peak, and Black Dome, the latter being 6707 feet above the sea. This is the highest summit in the Appalachian system.

8. *Vegetation of the Appalachian Ranges.*

The mountains of this system are almost everywhere heavily timbered with valuable woods. Among them are the white and yellow pines, the spruce, and fir, various species of maple, beech, ash, oak, and other trees. On the poorer lands and along the mountain ravines grow smaller species and bushes of various sorts, and in the swamps the hackmatack or black larch. The eastern or Atlantic slopes were heavily wooded throughout, but now, in many localities, the best of the timber has been cut for various uses. The necessity for fine timber for shipbuilding has caused the cutting of the best timber in Maine and most of the Southern States, and the demands of other manufacturing interests have caused the partial or total destruction of the timber in many other large areas. Still, the region of the Appalachians and that eastward to the sea is essentially a timbered region.

9. *Geology of the Appalachian Region.*

The Geological maps of North America show the Appalachian region to be largely covered with Palæozoic or the oldest stratified rocks which extend north-eastward from Alabama through the Southern and Middle States to Canada. East of the Palæozoic belt and parallel with it is an Archæan or Gneissic area, which attains its greatest width in Georgia and South Carolina. Between the Archæan strip thus outlined and the Atlantic coast is a Tertiary area which extends southward from a point in New Jersey near Sandy Hook to the northern part of Florida. This Tertiary belt is overlapped by alluvium, which has its greatest development in Florida, of which it forms almost the entire area. It is also of considerable extent in eastern North Carolina and the eastern shore of Mary-

land, and forms the surface formation of Long Island. From beneath the Tertiary, the Cretaceous formation outcrops in New Jersey, in North and South Carolina, and the northern part of Alabama.

In the Connecticut Valley, in South-eastern Pennsylvania, and in isolated areas in Virginia and North Carolina, remnants of the Triassic strata are seen resting on the Archæan.

The geological history of the Appalachian region may be very briefly described as follows:—

In Archæan time the Laurentian highlands of the United States and Canada rose above the ancient sea, and in Silurian time their southern slopes were washed by the Silurian ocean. This dry land stretched westward from Canada as a huge island of continental proportions. This was the "firstborn among the continents." Europe was then represented by islands.

When the Silurian era began, the Appalachian region was outlined by Archæan islands and reefs, which acted as barriers to the interior region where the Silurian, Devonian, and Carboniferous rocks were to be subsequently deposited. West of these sheltering islands and reefs were warm and shallow seas, whose waters were filled with beautiful corals, and stone lilies, and myriads of molluscs and crustaceans, whose remains are now found in the mud-marked rocks which once formed the gently sloping bed of the Silurian ocean. Before the era ended the Green Mountain region made its appearance as dry land, with, however, a much less elevation than at present. At the close the limit of dry land, which had been gradually extending southward and south-eastward, crossed the State of New York near the central, east and west line of the State; and at the close of the Devonian it had so expanded as to include the whole of the State, as well as the New England States.

With the ushering in of the next age there is a change. Dana speaks of the Sub-carboniferous as "a period of *submerged* continental regions," and of the Carboniferous as a period "of as extensive an *emergence;* not continuous emergence, but prolonged and repeated emergences, with little change of level, alternating with slight or partial subsidences."

The Carboniferous history of the Appalachian region is that of shallow seas changing gradually to fresh-water lakes, which were transformed in the course of centuries into marshes on which, under tropical atmospheric conditions, forests of gigantic ferns, horsetails, and conifers, flourished. There were no Alleghanies. This region was a portion of the great coal-making plain, and, with a part of Rhode Island, was covered with Carboniferous forests, marshes, and jungles, among which wandered numerous reptiles of uncouth form and huge proportions. The atmosphere, loaded with moisture and carbonic acid was unfavourable to the presence of the quick-breathing animals, but the waters teemed with life.

By the end of the period the Appalachian portion of the continent appears to have been almost completed. Its mountains were small in number; the Adirondacks, a few ridges in New Jersey, the Blue Ridge of Virginia, and perhaps the Black Mountains of North Carolina, make up the list; and the rivers gathered on these limited Archæan lands were small and insignificant.

Toward the close of Palæozoic time occurred the flexures and folds that resulted in the formation of the Alleghanies. The marshes were drained and the coal-bearing strata folded and elevated with numerous dislocations. As with the more ancient mountains, they remained parallel with the Atlantic coast.

In the next following age it is probable that the continental area extended much farther to the eastward than is

indicated by the present Atlantic coast, and has since been submerged by the subsidence of the land. The ocean now rolls over what was once a portion of the Triassic continent, over which roamed the higher types of reptiles and inferior types of mammals, which were prophetic of those to follow in the succeeding ages.

During the Cretaceous period the Atlantic coast-line extended from New Jersey, near New York city, southward to Georgia, at a distance of about 60 miles from the present coast-line; and in Georgia it turned abruptly to the westward, to merge into the shore of the intercontinental sea. The coast-line thus sketched appears to have changed but little until the end of the Miocene Tertiary, when it assumed very nearly its present shape, changed later only by the addition of Florida, and the narrow strip of alluvium reaching northward to the coast of Massachusetts.

10. *Mineral Resources of the Appalachian Region.*

Important as is the Appalachian system in its geographical features, and interesting as is its geological history, it is by its economic resources that it is best known to the world. Its coal and iron deposits are practically inexhaustible.

The mineral wealth of the Middle States is extensive and varied.

In Pennsylvania, gold, silver, copper, and sulphur in a native state, have been discovered, but none in sufficient quantity for profitable mining.

Zinc and nickel ores are mined, and the iron ores, of which nearly every known variety has been found in the State, have probably furnished one-half of the pig-iron manufactured in the United States. The zones in which these ores are found extend southward to Alabama and

northward into New York. Coal, however, is the most valuable economic product of the State, over 30,000,000 of tons being annually mined. Petroleum comes next in importance, but both this and coal will be considered at length in another place. In Maryland, chromic-iron and other iron ores are found in the central portions of the State, while in the north-west there are extensive deposits of bituminous coal.

The State of New York is also rich in iron ores, vast beds of magnetic iron occurring in the Adirondack Mountains and other localities in the northern counties of the State. Near Peekskill, layers 100 feet in thickness are found. The most extensive coarse salt-works of the United States are at Onandaga, New York, while the mineral springs of Saratoga have long been celebrated. Serpentine, soapstone, marls, and a host of minerals of minor importance, are found. The graphite of New York is the purest found in the country.

The argillaceous marls, pure marls, and shell marls of New Jersey, are used to the amount of more than 200,000 tons per annum in the State, and render its agricultural lands of higher average value than any other State in the Union. Her zinc-mines furnish seven-tenths of the zinc oxide, and one-fifth of all the metallic zinc produced in the United States. The Franklinite and red oxide found in Sussex County produce zinc free from arsenic. Iron is abundant, and lead, nickel, and graphite occur; while porcelain and potter's clays are dug to the extent of nearly 30,000 tons annually. Sand equal to any known for glass-making purposes is abundant, and largely used in the southern parts of the State.

The marls and bog-iron ores of New Jersey extend southward into the State of Delaware. The iron and coal zones of the Middle States follow the Appalachian Mountains into the Southern States. Besides coal and iron,

Virginia and West Virginia contain gold, silver, lead, and zinc ores, and rock-salt. The sulphur-springs of Virginia are held in high repute, and her salt-springs add largely to her mineral wealth.

The eastern part of Kentucky has rich and abundant deposits of coal and iron, which extend into Eastern Tennessee. The eastern coal area of Kentucky comprises from 8000 to 10,000 square miles, in which about ten beds exist aggregating about 30 feet. Much of this coal is bituminous; but a large part is especially adapted to smelting and iron-making, and iron ores are abundant, covering about 20,000 square miles of the State, although not as yet extensively used.

As is the case with the States already mentioned, coal and iron form the principal mineral resources of North Carolina.

Before the discovery of the California gold regions, the richest gold-mine in the United States was in Rowan County, North Carolina, and in 1840 it yielded $500 to the bushel of earth, or $3,000,000 in all up to the time the mine was flooded. There is still a branch of the United States mint located at Charlotte, North Carolina. Silver, lead, zinc, and copper all occur; and diamonds of the first water, of from half a carat to two carats, have been found. The chief source of granular or crystalline corundum, or emery, is also in North Carolina.

In South Carolina the finest quality of porcelain clays are found sometimes in beds of 60 feet thickness, and the phosphate marls are not only extensively used in the United States, but also largely exported. Proceeding farther south we find the States of Georgia and Alabama rich in minerals of economic importance. Immense deposits of iron are found in the north-western part of Georgia, and in Alabama the Red Mountain extends for

more than 100 miles across the State, having in its whole course a stratum of solid red iron ore from two to eight feet in thickness. Brown hematite is also abundant, and the iron manufactured is of excellent quality. The coal-fields of Alabama reach into Georgia. Gold was discovered in Georgia in 1831, and a branch of the United States mint was established at Dahlonega in 1837, and during the succeeding twenty-four years over $6,000,000 were coined there, mostly of Georgia gold. The mint was discontinued in 1861. In Alabama, gold was discovered in Randolph County in 1836, and up to June 1872 $213,750 had been coined at the United States mints, most of it previous to 1859.

In both States copper, lead, and silver are found, and various kinds of mineral springs.

When we turn to the New England States we find that the minerals of economic value are of far less importance than those of the other parts of the Appalachian region, although the list of minerals of scientific interest is very extensive. Gold has been discovered at a number of localities in Massachusetts, and is being successfully mined at Newburyport, while Chester has furnished considerable quantities of emery of good quality.

In New Hampshire graphite is mined for the manufacture of crucibles, and Vermont furnishes black, white, and variegated marbles. The Thomaston quarries of Maine have furnished large supplies of lime for various parts of the United States. Rhode Island also is noted for its coal-fields. Maine, Vermont, Massachusetts, and Connecticut produce iron, but in small quantity compared with Pennsylvania.

11. *The Appalachian Coal-Fields.*

The coal-fields of the United States cover an area of

more than 200,000 square miles, of which about 60,000 square miles belong to the Appalachian system, and are distributed as follows :—

New England anthracite field . .	750 sq. miles.
Pennsylvania anthracite fields . .	470 „
Southern triassic coal-fields . .	220 „
Alleghany coal-field . . .	58,737 „
Total . .	60,177 „

In eastern North America the coal strata are all of Carboniferous age, except those of the small Triassic basins of Virginia and North Carolina.

In Rhode Island the Carboniferous Strata are highly metamorphosed, and the coal contained in them has been partly converted into graphite, the variety found there being known as plumbaginous or graphitic anthracite. In Pennsylvania there is a regular gradation in the coal as we go from east to west in the State. In the most eastern portions we have the hardest anthracites, and next semi-anthracite, which extends in a belt from Pennsylvania to Alabama. In Western Pennsylvania and adjacent portions of Ohio the coal is bituminous, these areas having been so far removed from the focus of metamorphic action as to have retained the volatile matters in their coals.

The first coal-field developed in the United States was that near Richmond, Virginia, where in 1857 trees over 100 years old were found growing on banks of waste coal. The export from these mines to Philadelphia, New York, and Boston, was considerable from 1789 up to 1844, but since the latter year there has been a struggle to compete in the home markets with other coal.

The New England graphitic-anthracite basin has three beds of coal that have been developed, although

the amount that has been mined is insignificant. The coal, when pure and solid, compares favourably with the Pennsylvanian anthracite, with which its plant-remains show it to be related.

The Pennsylvanian anthracite coal-fields are divided into about four basins, which were once a single field, but which has been folded and upheaved and broken into fragments by fracture and erosion. This upheaval and folding changed the bituminous coal into anthracite by driving out the volatile matters through the agency of the heat and pressure developed.

The discovery of anthracite was made in the Wyoming Valley of Pennsylvania soon after its settlement, and the first authentic account of its use was in 1768-69. In 1777, coal was quarried near Wilkesbarre, and taken to Carlisle, where it was used by blacksmiths and gunsmiths, this probably being the first successful use of anthracite in the world. From 1791 to 1814 coal was taken to Philadelphia from the Lehigh region at various times, but it could not be made to burn. The city authorities purchased some to supply the steam engines of the water-works, but could not ignite it, and it was broken up to gravel the walks in the grounds surrounding the works. In 1812 Messrs. White and Hazzard procured some coal from Pottsville for their wire-manufactory near Philadelphia. Mr. Daddow thus describes their experience:—

"Mr. White and his firemen spent half a day in the attempt to burn it without success. At noon they closed the furnace doors, and went to their dinner in disgust with the 'stone coal;' but on their return they were astonished to find the doors redhot and the furnace in danger of melting."

The general trade began in 1820, and at first the increase in the consumption was slow. The following

shows the production for the decades beginning with 1820.

1820	365	tons.
1830	359,190	„
1840	5,210,685	„
1851	18,954,678	„
1860	53,333,469	„
1870	106,883,488	„

Anthracite is also found in a few localities in Virginia, but the basins are small.

The Triassic area of Virginia has already been alluded to. There are two similar areas in North Carolina, but the coals are not very promising. In all these localities the coal is bituminous.

The Alleghany coal-field is the largest in the Appalachian region, containing over 58,000 square miles. It is club-shaped when outlined on the map, and comprises portions of Pennsylvania, Ohio, Maryland, Virginia, West Virginia, Kentucky, Tennessee, Alabama, and Georgia. It may be considered as an elevated plateau, which reaches an elevation of 2000 feet above the sea in Tennessee, and has its greatest depression along the Ohio River below Pittsburgh, Pa.

The coal is partly bituminous and partly semi-bituminous. In Pennsylvania there are eight basins, two of which have been identified in Maryland and two in West Virginia. The area in Tennessee is divided into two basins, and in Alabama there are four. The trend of these basins is the same as that of the Appalachian Mountains.

The production of the Alleghany coal-field in 1871 was 17,257,625 tons, of which nearly two-thirds was from Pennsylvania. The more southern coal-areas have as yet been only partially worked.

12. *The Petroleum Districts.*

The Appalachian petroleum districts include portions of Pennsylvania, Ohio, and West Virginia. The deposits of Pennsylvania on Oil Creek are the most extensive, furnishing more than three-fourths of all the petroleum of commerce.

The occurrence of oil in these regions has long been known, and evidences have been found which indicate that wells were dug by the ancient people, of whom traces have been discovered in the copper regions of Lake Superior, and who built the mounds of the Mississippi Valley. The North American Indians also collected the oil, and sold it under the name of seneca oil. In boring for salt-wells in Ohio in 1819, it was also discovered, but considered an evil, as it interfered with the manufacture of salt.

Oil Creek, in Pennsylvania, was early named in consequence of the occurrence of oil along its banks, which floated on the surface of the water. The inhabitants of the region were in the habit of collecting it from the surface of pools and ditches by allowing blankets and woollen cloths to become saturated with it, and then squeezing out the oil. A company was formed to collect oil in this way, but it could not compete with those that manufactured oil from bituminous coals and shales.

In 1858, Colonel E. L. Drake, who had made his residence at Titusville, on Oil Creek, began to sink a well for oil, much to the amusement of his friends and neighbours, who considered the project absurd. The work progressed slowly, and when in August 1859 oil was struck at a depth of 71 feet, there was intense excitement.

At first 400, and soon 1000 gallons were pumped daily, and this continued without interruption for weeks.

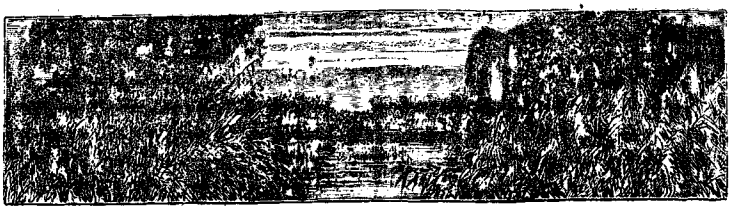
No mining enterprise had ever offered such opportunities for sudden wealth. Every spot where oil had ever been found, or was likely to be found, attained a new value, and the farmers of Oil Creek Valley soon became millionaires. Every one who could leave home rushed to the oil regions, which became the centres of incredible activity. The villages presented curious aspects with the tall derricks for boring wells scattered among their gardens and house lots. The entire valley was filled with a forest of derricks. Towns sprang into existence with the rapidity of mushrooms, not in years, but in weeks and days. In 1865, Pithole City, four months after its foundation, had a population of 5000, nearly all men. It had forty taverns and eating-houses, an opera house, several banks, a newspaper, a theatre, and several churches.

Though the place was so young, unlike the California mining towns, good order was kept, although there had not been time to appoint magistrates.

As the novelty wore off, a permanent industry was established, and an extensive branch of trade developed, which in some respects surpasses in importance that resulting from the discovery of gold in California in 1849.

The production of oil in the Pennsylvania districts steadily increased from 3200 barrels in 1859 to 10,910,300 barrels in 1874, the total production for the whole period being 76,326,730 barrels, with a total value at the wells of $245,904,880. The amount of oil exported in 1872 was 27,812 barrels, which in 1875 had increased to 5,200,000 barrels. The price per barrel decreased from $13 in 1859 to $1·21 in 1875.

The export of petroleum now is a large business interest at Philadelphia and Baltimore.



MISSISSIPPI SHORE.

CHAPTER III.

THE MISSISSIPPI VALLEY.

1. *Extent—General Features.*

EAST of the Cordillera mountain system lies a great depression, occupying the whole length of the continent, from the Arctic Ocean to the Gulf of Mexico, and stretching eastward to the Appalachian range. Properly considered, it really forms but one valley, though of prodigious extent. Formerly it was in part the bed of a great inland sea, and even in the Jurassic period the eastern and western sections of the continent were divided by a branch of the sea from the Gulf of Mexico northwards to the Arctic Ocean. The southern part of this gigantic valley is now occupied by the Mississippi, the "Father of Waters," which, flowing southerly into the Gulf, receives many large and long affluents from the east and west. For long distances on either side the country consists of plains, gently sloping to the bed of the main stream. Of this great river, Foster, in his *Mississippi Valley*, says, "The Mississippi River, when we consider its great length, the number and character of its tributaries, often exceeding the first-class rivers of Europe, the area of country which it drains, the vast system of inter-

nal navigation which it affords, and the populous towns which have been founded on its banks, may be regarded as one of the most striking topographical features of the earth. . . . This great river-system penetrates to the very heart of a continent, and, with its numerous tributaries, affords an inland navigation of unsurpassed magnificence."

2. *Lake Itasca—Course of the Mississippi.*

In the northern part of the State of Minnesota, in a region of lakes and forests, lies Lake Itasca, under a low sandstone ridge, overgrown with pine-trees. From it flows a little streamlet, taking a southerly course, which farther on becomes the mighty Mississippi. At first it winds through the lacustrine State of Minnesota, traversing several of the countless lakelets which dot its surface, and forming a series of rapids, of which the Falls of St. Anthony marks the limit of its upper course. Along its middle course, where it serves as the boundary line between several States, it receives many great branches, —from the west the Missouri, Arkansas, and Red Rivers, —from the east the Ohio. Its course throughout is very winding. In the upper part it is bordered by high steep bluffs, the margins of the flat prairie level, which stretches back to a limitless distance on either side. Between the bluffs the great river meanders from side to side of a broad bottom-land of inexhaustible fertility.

Farther south the bluffs disappear, the banks become low and liable to overflow by the floods of the river. In former times great areas of the Southern States were covered with water by these inundations. Now, a system of levées, extending for enormous distances along the river, curb its destructive propensities, and have reclaimed vast areas of cotton and rice lands.

The river has as tawny a mane as the Roman Tiber. From the arid plains of the west its great, swift branches come, loaded with detritus, and below the mouth of the Missouri the great river is a dense yellow torrent. The southern part of Louisiana is the work of this river. The soil on which New Orleans is built was carved from the rocks of the high plains 3000 miles away.

The waters of the river reach the Gulf of Mexico through a number of passages, known as passes, of which five now afford exit to the water, while several others, which have been open, are now closed up by the deposit of detritus, and have become lakes or bayous.

At the mouths of the passes, where the current is checked by contact with the still waters of the Gulf, the silt is deposited, and bars are the result. These bars are of course serious impediments to navigation, and much labour and money have been expended in attempts to remove them. This has at last been accomplished by an American engineer, Mr. J. B. Edes. By means of a system of jetties, by which the rapidity of the current was increased, the stream scoured its own bar away, and scattered the material far and wide over the bed of the Gulf.

By this means the South Pass, which previously had a depth of but four feet on its bar, now—1879—has a depth of thirty feet, and the largest vessels are daily passing in and out.

The following table, taken from Humphrey's and Abbot's *Physics and Hydraulics of the Mississippi River*, gives much valuable data concerning this great stream and its affluents:—

THE MISSISSIPPI RIVER AND ITS TRIBUTARIES.

	Drainage Area. Sq. Miles.	Length. Miles.	Navigable Length. Miles.	Elevation in Feet.		Discharge per Second. Cub. Feet.
				Of Head.	Of Mouth.	
Ohio River . . .	214,000	975	975	1,650	275	158,000
Upper Mississippi (above mouth of Missouri) . . .	169,000	1330	658	1,600	381	105,000
Missouri . . .	518,000	2900	2644	7,000	381	120,000
Arkansas . . .	189,000	1500	522	10,000	162	63,000
Red River of Louisiana . .	97,000	1200	595	2,450	54	57,000
Yazoo River . .	13,850	500	240	210	103	43,000
St. Francis River	10,500	380	80	1,150	200	31,000
Mississippi (below mouth of Missouri)	1,244,000	1286	1286	381	0	675,000

The drainage-area and discharge given under the latter are those of the whole system.

Of the branches mentioned above, the Missouri and Arkansas rise in the Rocky Mountains, a part of the Cordillera system; the Red River is also a western tributary, rising in the Llano Estacado of Texas and New Mexico. The Ohio River is the principal eastern tributary, draining the whole western slope of the Appalachians. The Yazoo and St. Francis are confined to the low prairies of the middle of the valley.

3. *Secondary Tributaries of the Mississippi.*

Of the secondary tributaries of the Mississipi, many are of first-rate importance. Thus the Yellowstone, a branch of the Missouri, has a length of 535 miles, 400 of which is navigable by steamers of light draught. The Platte also, though a shallow stream, and consequently navigable only for small boats, has a length of about 800 miles, and drains an enormous extent of country. The Kansas or Kaw River is another very large branch.

The Arkansas has two large branches—the Canadian and the White Rivers. The former rises in the eastern foothills of the Rocky Mountains, about 6000 feet above the sea, and has a course of about 1000 miles in length. The latter, which discharges in part into the Arkansas, in part into the Mississippi directly, drains the northern part of Arkansas and the southern part of Missouri.

The Upper Mississippi has very many large tributaries from both sides. Among them may be mentioned the Minnesota, Wisconsin, Rock, Cedar, Des Moines, and Illinois Rivers, the last two of which have lengths of about 400 miles each. Most of these are navigable for greater or less distances.

The Ohio is the result of the junction of a number of large navigable streams. The Alleghany and Monongahela unite at its head. Lower down it receives the waters of the Tennessee, the Cumberland, the Wabash, Kentucky, and the Great Kanawha.

4. *The Mississippi Basin.*

The region drained by this river differs extremely in its different parts, in surface, climate, elevation, and natural products. That portion of it lying west of the 100th meridian belongs properly under the head of the Cordilleras, and will be reserved for the chapter relating to that region. The middle and eastern portions of this drainage system present somewhat more uniformity.

Most of the upper course of the Mississippi proper is through a country densely timbered with coniferæ, more or less marshy, and dotted with innumerable small lakes. This includes nearly all of Minnesota, the northern part of Wisconsin, and the eastern portion of Dakota.

5. *The Prairies.*

Farther southward the timber thins out, the surface becomes very level, and the lakes disappear. The prairie region begins. Its characteristics are a level surface, very fertile soil, well watered, and naturally covered with high waving grasses, interspersed with scattered belts and masses of timber. This is the agricultural region of the country. The prairies cover the States of Indiana, Illinois, Iowa, Missouri, Arkansas, Western Tennessee, and Kentucky, Southern Michigan and Wisconsin, and Eastern Nebraska, Kansas, and Indian Territory, shading off to the westward in the three last States into the high arid plains.

South of the prairie section is the semi-tropical region of the Texas coast, Louisiana and Mississippi, with the coast region of Alabama, and the swampy state of Florida; a region characterised by a hot unhealthy climate, level surface, and dense tropical vegetation.

6. *Geology of the Mississippi Valley.*

The region of the Mississippi Valley in Archæan time was covered with a great inter-continental ocean, with here and there isolated areas of land west of the present Mississippi, in what are now the States of Missouri, Arkansas, and Texas. The waters of this ocean washed the southern shores of the young continent that then occupied only British America. During Silurian and Devonian time this continent gradually expanded to the southward, until, near the close of the Carboniferous period, a large portion of the Mississippi Valley was a vast level plain, which was continuous with that in the Appalachian region. The whole country was "one vast forest, except where fresh waters lay too deep for forests

to grow; and the lakes probably had islands of shrubbery and forest vegetation floating over the waters, as is now true of some of the tropical lakes of India." "Being thus level, there could have been no great Mississippi or Ohio; the continent would have had no sufficient drainage, and the wide plains would necessarily have been marshy and spotted with shallow lakes."—(Dana). On the east of this basin were the Green Mountains, and on the west the embryo Rocky Mountains. "The interior sea, which in Silurian and Devonian periods had spread from the Gulf of Mexico over the whole interior continental basin, and northward on the west side of the Archæan nucleus to the Arctic Ocean, after many variations eastward and westward in its extent through the whole Palæozoic, was at last mostly limited to the region west of the Mississippi."—(Dana).

In Mesozoic time the continent reached westward to Kansas; the Gulf of Mexico extended as a bay northward to the mouth of the Ohio, and westward it extended over much of the region of the plains and the Rocky Mountains, probably as far north-westward as the Arctic Sea. After the Cretaceous this Mediterranean Sea disappeared, but it was not until after the Miocene Tertiary that the Gulf of Mexico retreated to near its present limits. During the Tertiary the Ohio and Mississippi barely united before emptying into the Gulf. It was not until the Quaternary that the Mississippi River system was completed. Such is the brief sketch of the geological history of the region of the Mississippi Valley.

7. *Mineral Resources of the Mississippi Valley.*

The mineral resources of the Mississippi Valley are extensive, and comprise iron, coal, lead, and copper, as the principal minerals of economic value.

The State of Louisiana contains the most extraordinary deposits of salt ever discovered, while Michigan stands in the first rank of mining States on account of her production of copper and iron ores. Copper and lead are found in all the Northern States of the Valley. Gold and silver exist in moderately paying quantities in Minnesota, but the region is yet so wild that mines are not worked on account of their inaccessibility. In the same State also are found quarries of Indian pipestone, which is used for a variety of purposes.

In richness and variety of mineral products the State of Missouri is not surpassed by any other State in the Union. Silver is found in connection with galena, and iron is found in every county. Copper mining was once carried on, but since the opening of the Lake Superior copper-mines it has been rendered unprofitable. Iron is the principal product of the State, and after it comes lead, the mines of the State producing a larger quantity than all the other portions of the United States together.

Lead is also found in Illinois, Iowa, and other States.

Hot springs are found at many localities, but those of Arkansas are the most celebrated. They are about 60 miles S.W. from Little Rock, and comprise about 60 springs ranging in temperature from 93° to 148° F. The waters contain a large amount of carbonic acid, and carbonates of the alkalies and alkaline earths, and are said to be very efficacious in many chronic diseases.

Coal is the most widely distributed of the economic minerals of the Mississippi Valley, and is found in three principal basins or fields.

8. *Coal-Fields of the Mississippi Valley.*

A large part of the prairies is underlaid by coal-beds which are all of bituminous varieties, no anthracite being

found west of the Appalachian range. There are three areas, viz. the Michigan Basin, the Illinois Basin, and the Missouri Basin. The Alleghany Basin of the Appalachian region also extends somewhat into the Mississippi Valley region, especially in Ohio, Eastern Kentucky, and Tennessee, and in Alabama.

The coal-fields are distributed about as follows:—

Michigan Basin . . .	6,700	square miles.
Illinois Basin . . .	47,188	„ „
Missouri Basin . . .	84,343	„ „

The Michigan Basin occupies the lower peninsula of Michigan, its coal-measures occupying nearly 7000 square miles, 123 feet in thickness, with a maximum of 11 feet of coal. It is thickest in the centre of the basin, and thins out to the thickness of paper at the edge. In the highest portions of the peninsula it is mostly at such a depth as to require constant pumping to keep the mines free from water. The coal is bituminous and of fair quality, though not the best.

The Illinois Basin includes portions of Indiana and Kentucky, about 4000 square miles being in the latter, and over 6000 in the former. It is sometimes called the central coal-field. In Illinois there are ten beds aggregating 38 feet in thickness, and in Western Kentucky nine beds, 29 feet thick in all. The coal is non-coking or free-burning bituminous coal, known generally as "block coal," because it comes out in square pieces, owing to the multitude of joints and seams in the beds. The proximity of these coal-areas to the vast manufacturing establishments of Chicago and St. Louis, and to the steamers on the Mississippi, enhance their value. The coal is also valuable for the smelting of iron. The coal production of Illinois is about 2,000,000 tons per annum. The total production of the basin in 1872 was nearly 4,000,000 tons.

The Missouri Basin, or the Great Western coal-field as it is sometimes called, is the largest in territorial extent in the United States, although the beds of coal are thinner and not so numerous as those of the Alleghany field in the Appalachian region. The coal-measures of this field extend over a large portion of Iowa, the north-western part of Missouri, and parts of Nebraska, Kansas, Indian Territory, Arkansas, and even extend into Texas.

Good workable coal has not been discovered in Nebraska, and little is known of the Indian Territory area. The coal-measures of Iowa are about 200 feet in thickness. The area in Missouri is about 23,000 square miles, and the coal is of various qualities, some coking, and others being non-coking. The grade is between block and cannel, and the coal contains a large proportion of water and sulphur. The total production of the Missouri Basin in 1872 was only 250,000 tons.

9. *Iron.*

Iron is found in workable quantity, in many places covering large areas in the Mississippi Valley. It occurs in almost fabulous quantity, and in almost innumerable forms, in Missouri; and in connection with coal deposits, as argillaceous hematite and carbonate, it underlies great areas in Tennessee, Kentucky, Indiana, Illinois, and Michigan.

The iron ores of Tennessee have until lately kept her in the fifth place among the States of the Union in the production of iron. The facilities for the supply of wood and coal for smelting, limestone for fluxes, and sandstone for hearths, are such that iron can be made more cheaply in Tennessee than anywhere else in the world.

In Missouri iron is found in some form in every county—bog ores in the south-eastern part of the State, limonite or brown hematite in the southern counties,

goethite in Adair County, red hematite in the coal-measures with spathic ores, red and yellow ochres in many counties, and the specular ores in vast quantities in Iron Mountain, Pilot Knob, and Shepherd Mountain. Of the latter, Iron Mountain and Pilot Knob are the most celebrated. The former is an eruptive elevation of mammillary shape, covering 500 acres, and having a height of 228 feet. It forms the western extremity of a ridge of reddish feldspathic porphyry, and consists chiefly of an iron ore, which contains 55 or 60 per cent of iron that is free from sulphur. The amount of ore seems to be immense, the main body having a thickness of 50 feet, and continuing indefinitely in depth. 371,474 tons of ore were shipped from Iron Mountain in 1872.

Pilot Knob differs considerably from Iron Mountain. It is much higher, and its ores are more siliceous in character. It rises 650 feet above its base, and is mainly composed of a dark siliceous rock, which forms at least two-thirds of the hill in the lower part. Above this the iron is found in heavy beds alternating with siliceous bands. Some of the beds are very thick, and made up of very pure micaceous and specular iron ore. There are other similar localities in the neighbourhood.

10. *Lead.*

The only lead-producing districts of the United States are both located in the Mississippi Valley, and are those of the Upper Mississippi, and those of Missouri.

The first of these comprises the region in the south-western part of Wisconsin, and the contiguous portions of Iowa and Illinois, by far the larger part lying within the limits of the first-mentioned State. The lead is found in gash-veins in the galena limestone which belongs to the Lower Silurian system. This limestone has been exten-

sively eroded, and forms broad valleys and plains, the soil of which, derived from the wearing down of the underlying rock, contains many masses of galena. These scattered masses are not only valuable in themselves, but often lead to important deposits in the rock beneath. The production of galena in this district in 1825 was 664,530 lbs. The increase was rapid until 1854, when it was 54,494,856 lbs., since which it has gradually but irregularly declined.

The lead of Missouri is found in an older formation than that of the Wisconsin district, and the fissures are more continuous, giving more certainty to mining operations. There are two fields—one in the south-eastern part of the State and the other in the south-west. Among the Missouri lead-mines the "Mine La Motte" was first worked more than 150 years ago, and is valued at more than $500,000, although it has at times yielded more than 1,000,000 lbs. of lead per annum. Valle's and Perry's mines in St. Francois County have been scarcely less productive. In these mines a system of inosculating veins of ore have been found, the limits of which have not yet been reached.

11. *The Salt-Mines of Louisiana.*

The salt-springs of Louisiana were somewhat noted as far back as 1812, but they were at some distance from market. In 1861 an extraordinary deposit of salt was discovered on Petit Anse Island on the coast. The island rises 160 feet out of the sea marsh that lies along the coast of the State, and contains about 5000 acres covered with forest. The salt is a pure chloride of sodium, without dirt or foreign matter, and exists as an amorphous mass of rock-salt with its crest 20 feet under ground, and some 50 feet below the summit of the island. The solidity of the salt is complete, and as there are no seams

or cleavage, tunnelling is difficult, and blasting mars the purity of the salt. During the civil war this island furnished the Confederacy with a large supply of salt. A shaft was sunk 50 feet into the deposit, and tunnels were run east and west from this for about 100 yards without reaching its margins. About 2000 tons were mined and carried to the surface. The facilities for reaching markets are good, but little has been accomplished in mining it up to the present time.

In sinking the shaft of the mine, remains of pottery and implements of various kinds were found, with human bones, and the bones of the mammoth, mastodon, elk, and deer. It is probable that the animals resorted to this place on account of the salt, and that the men frequented the place for game. The waters of the Quaternary sea overtook them suddenly, and left them very near where they perished, and now the island is separated from the mainland only by a marsh, and is reached by a dike and plank-road three miles in length.

12. *The Great Lakes and the St. Lawrence River.*

East of the northern portion of the Mississippi Valley, and occupying a part of the same general depression, are the great lakes of Superior, Huron, Michigan, Erie, and Ontario. They are connected with one another, and drain to the Atlantic by the River St. Lawrence.

The following table gives their dimensions, height above sea level, etc. :—

	Area. Sq. Miles.	Length. Miles.	Elevation. Feet.	Mean Depth. Feet.
Lake Superior	31,400	355	609·40	1000
„ Michigan	25,600	340	589·15	990
„ Huron	23,800	280	589·15	1000
„ Erie	10,000	250	573·08	120
„ Ontario	7,300	190	250·00	606

13. *Lake Superior.*

The shores of this lake are everywhere rocky and bluff, and the country about is very densely timbered with coniferæ. From near its upper end a chain of lakes, with rapid connecting streams, extends westward to the Lake of the Woods. The boundary line between the United States and British America follows this chain of water communication as far as this lake, and thence westward the 49th parallel of north latitude serves as the boundary.

The shores of Lake Superior are rich in mineral wealth. Native copper, in great abundance, is found on both northern and southern shores, and on Isle Royale. The copper-mines in Northern Michigan are the chief source of that metal in the United States. Silver also is found to some extent in connection with the copper. The southern shore of the lake, in the neighbourhood of Marquette, is underlaid by vast beds of pure hematite, which is now being quarried and smelted in enormous quantities.

The river St. Marie connects Lake Superior with Huron. On this river are the picturesque rapids, or the Sault St. Marie, where the river rushes tumultuously down an inclined plane among rocks and islands.

14. *Lake Huron.*

This is the next link in the chain. Its shores are mainly low, and everywhere heavily timbered. Its western coast is broken only by Saginaw Bay, opening into the lower peninsula of Michigan; but on the east it extends, with many bays, far into the Dominion of Canada.

15. *Lake Michigan.*

Lake Michigan, though not a part of Huron, is connected with it at its northern extremity. It cuts the State of Michigan into its two peninsulas, and separates the lower one from Wisconsin. Like the others, its shores are well timbered.

Lake Huron is drained by the St. Clair River, southward to the little lake of St. Clair, thence by the Detroit River into Lake Erie. The Niagara River connects the latter with Lake Ontario.

16. *Niagara River and Falls.*

The great natural wonder of this region is the Falls of Niagara, discovered by Père Hennepin in the year 1678. The Niagara River, forming the boundary line between Canada and the States, flows almost north for a distance of 36 miles of which 22 are above and 14 are below the Falls.

Above the Falls the river encircles a large island, known as Grand Island, its course thus far being quiet. Presently, however, it begins to feel the influence of the coming leap, and sweeps along more impetuously, and soon breaks into furious rapids. Reaching the head of Goat Island, it separates into two branches; that on the American side rushing straight forward to the brink in a mass a thousand feet broad, and shooting over into the gulf below. That on the Canadian side of Goat Island sweeps around, and plunges over a cliff in the form of a horseshoe (hence the name of this fall), the two parts of the river mingling at the foot of the fall.

The height of the American Fall is 180 feet. That of the Horseshoe Fall is slightly less, owing to the smaller height of the crest. Its leap is 173 feet.

The subjoined description of this stupendous water-

fall is quoted from N. P. Willis, in his *Canadian Scenery*, ii. pp. 42-44 :—

"As the current approaches Goat Island it seems to flow with redoubled velocity. It is impossible to conceive anything equal to the force and swiftness of its progress to the ledge of rocks over which it is propelled, till it impetuously tumbles into the bed of the river beneath, with a noise louder than thunder. When the waters fall into the deep basin, they rebound into the air in immense spherical figures, white as snow and sparkling as diamonds. These figures, after rising and apparently remaining stationary for a moment, explode at the top and emit columns of spray to an astonishing height. They then subside and are succeeded by others, which disappear in the same manner.

THE RAPIDS AT NIAGARA.

"From that part of the Table Rock which yet remains, and the path which I have already described, the spectator commands one of the grandest and most romantic views in nature. The tremendous rapids above the Falls —Goat Island in their midst, covered with trees, which seem at every moment about to be swept away; the Horseshoe Fall, immediately below Table Rock; Fort Schlosser Fall, beyond Goat Island; and the frightful gulf beneath, boiling with perpetual rage and shooting upwards immense volumes of sparkling foam, smoking with apparent intensity of heat;—are a few of the great objects which are forced upon his attention.

"Another place from which the Falls assume, if possible, a more striking and awful appearance, is at the bottom of the cataract. The precipice leading to this spot is descended by means of a ladder, commonly called the 'Indian Ladder,'—a piece of mechanism consisting simply of a cedar tree, the boughs of which are lopped off at sufficient distance from the trunk to make them answer all the purposes of irregular steps. After descending this ladder, the perpendicular height of which is upwards of 60 feet, you proceed along the edge of the river, which is covered with broken rocks, wrecks of boats, and other rubbish, until you arrive at the bottom of the Horseshoe Fall. From this place visitors frequently proceed on foot several hundred yards, within a prodigious sheet of caverned water, which is formed by the overshooting of the cataract. But they must be men of the firmest nerve who venture on such a daring enterprise, for the most undaunted resolution is in danger of being shaken on looking upward at the impending rock, which continually seems to bend and groan beneath the rolling flood, to which it serves as a fearful support. From the projecting edge of this rock the mass of waters is impelled forward, and leaves a large and smooth expanse, which reaches from the sheet of falling water to the very base of the gradually undermined mountain. If the atmosphere be dense it is still more dangerous to engage in the bold attempt of exploring the stable foundations of the river, for people at such times not infrequently lose the power of respiration in proceeding far beneath the rocky ceiling. Notwithstanding this and various other dangers to which all are equally exposed who venture to approach the Fall in boats, the fisherman frequently continues there for hours together, apparently without any apprehension of danger.

"The whole breadth of the precipice or falls, including

the islands which intervene, is 1335 yards. The greatest body of water falls on the Canadian side of the river, and on account of the form assumed by the waters before they are dashed from the top of the rocks, it is designated the Horseshoe Fall. It extends from the shore to the intermediate island, a distance of 600 yards. Fort Schlosser Fall, which is on the American side, presents a sheet of water 350 yards in breadth, and the Little Fall extends across a ledge of rocks for upwards of 140 yards. The quantity of water which pours over all three in every minute is estimated at 169,344,000 gallons. . . .

"The noise of the fall is said to be heard, on a calm evening, as far as Burlington Heights, a distance of 50 miles. But when this is true the wind, which is an excellent transmitter of sound, must blow exactly in that direction. The waters make a report which might be heard at a much greater distance, if, instead of falling into a profound gulf, surrounded on every side by hills of at least 350 feet in perpendicular height, which confine the sound, they fell upon a horizontal plain of sufficient altitude to allow the sound to pass without interruption into the circumjacent country."

Niagara forms no exception to the general rule that all waterfalls tend to work backwards to the source of the stream. It is continually retreating towards Lake Erie, which it must one day reach, when that lake will be lowered to the same level as Ontario. The progress of this backward tendency, which, however, would seem to have been exaggerated, has been calculated by Lyell to amount to about one foot every year. The fall rushes over a limestone bed, and would probably have produced no great erosion but for the fact that for the last 78 feet of its course, a more yielding argillite or clay slate has been washed from beneath the overlying limestone by the

mechanical force of the vast volume of water here precipitated.

17. *Geology of the Region of the Great Lakes.*

The Great Lakes lie along or near the line of contact between the oldest stratified rocks and the granitic rocks; they are near the limit between the oscillating part of the continent and the stable Archæan area, and to this fact owe their formation (Dana). In the early Quaternary age the entire region was one immense lake which spread far to the southward, and probably had its outlet through the Mississippi River. Later, an elevation occurred, which made a vast change, and the immense interior lake became the five great lakes which discharged their waters through the St. Lawrence. When the Niagara shall have carried its gorge back to the mouth of Lake Erie, great changes will again ensue. As Prof. Newberry says—"Every day sees something taken from the rocky barrier of Niagara; and, geologically speaking, at no remote time our great lakes will have shared the fate of those that once existed at the far West. Already they have been reduced to less than half their former area, and the water level has been depressed 300 feet or more. This process is pretty sure to go on until they are completely emptied.

"The cities that now stand upon their banks will, ere that time, have grown colossal in size, then gray with age, then have fallen into decadence, and their sites be long forgotten, but in the sediments that are now accumulating in these lake basins will lie many a wreck and skeleton, tree trunk, and floated leaf. Near the city sites and old river mouths these sediments will be full of relics that will illustrate and explain the mingled comedy and tragedy of human life. These relics the geologist of the

future will doubtless gather and study and moralise over, as we do the records of the Tertiary ages."

The Lake Superior region has been long known as a copper region, the Jesuits, who travelled extensively through the region, having filled their accounts with exaggerated and extravagant stories of its abundance. Numerous excavations have been found, some 50 feet deep, in which stone hammers, fragments of charcoal and copper tools, have been found, showing that some ancient people carried on mining operations. Some of the trees growing over the excavations show that they are at least several hundred years old. The present Indians have no traditions as to copper mining, nor do they have any conception as to who did the work.

The first actual mining operations were in 1771, but it was not until 1845-46 that the shores of the lake were whitened with the tents of miners and geologists. In 1847 the country was almost deserted, but in 1850 copper mining became firmly established, and has continued to develop. The northern shores are high and composed of Laurentian and Huronian rocks which contain silver. On the southern side the shores are lower and more sandy, and the rocks are mainly Silurian sandstones associated with igneous rocks that were ejected through fissures. The copper occurs in irregular veins in both the igneous rock and the sandstone near their junction. The copper is mostly native, and occurs in great masses or sheets, and in strings made up of imperfect crystals, with which silver is associated in imbedded grains. The pure copper frequently occurs in such immense masses that it is almost impossible to mine it.

CHAPTER IV.

THE CORDILLERAN PLATEAU.

1. *General Geographical Features.*

THE western part of the North American continent is one great plateau, crested by the numerous ranges which collectively make up the Cordilleras of North America. Occupying nearly the whole breadth of Mexico, from ocean to ocean, it enters the United States with a great breadth, extending, with its long eastward slope, from near the 100th meridian westward nearly to the Colorado River. Its flat crest is at the continental water-parting, where it is 4000 to 4500 feet above the sea. As we follow its limits northward, we find its eastern boundary, though indefinite and shading by imperceptible degrees into the prairies of the Mississippi Valley, generally to run nearly north on the 100th meridian.

The western boundary sweeps gradually to the westward to the Sierra Nevada, and follows this great range and the Cascade Mountains of Oregon, Washington Territory, and British Columbia. As its breadth increases, its elevation increases also. The continental water-parting, following its summit, increases in elevation through New Mexico and Colorado, reaching its maximum in the latter State, where, over a great area, the mean elevation of this plateau is from 8000 to 9000 feet. Thence northward its elevation decreases gradually, and at the northern boundary of the States its mean elevation is not above 4000 feet.

Eastward from the crest, the plateau slopes gently in a long even incline down to the Mississippi Valley, forming what is known as the plains.

On the westward the general features are more complex. The great Colorado River of the west heads near the crest line of this general plateau, and, pursuing a course generally somewhat west of south, enters the Gulf of California at the southern boundary of the States.

This great river, with its long tributaries from either side, indicates a great general depression in the surface, with a corresponding rise on the west. This rise, which may be considered as a spur from the main crest, joins it near the head of the Colorado River. The Wahsatch range of Utah stands upon this summit line.

West of the Wahsatch range, extending thence to the Sierra Nevada of California, is a great area of

ON THE COLORADO RIVER.

country known as the Great Basin, the waters of which have no communication with either ocean, and consequently no outlet save evaporation. This area has an irregularly elliptic form, extending northward nearly to the Columbia River in Northern Oregon, and southward into Southwestern California. Of the details of this curious region more will be said farther on. Near the middle of this Basin there is a well-marked rise of the general level, on a meridional line, while east and west of it there is a depression, the eastern being at the base of the Wahsatch range, and the western at the eastern foot of the Sierra Nevada.

In the northern section, the plateau westward from the crest appears to have a more uniform slope downward.

In British America the eastern line of the plateau trends rapidly off to the west, narrowing the plateau, and at the same time it decreases in elevation.

The ranges which crown this plateau are many and complex, ranging widely in height, in orographic forms, and in mode of formation. One great generalisation, however, includes nearly all of them. Their trends, with very few exceptions, whether of main or secondary chains, are nearly north and south, ranging but a few degrees on either side. The only known exceptions to this general law are the Uintah range of Wyoming and Utah, and the Sweetwater range of Wyoming, which trend very nearly east and west.

We find the main streams of this region conforming to the general slopes, regardless of such minor obstacles as mountain ranges, which may have arisen to dispute their path. The branches of the Missouri, Arkansas, and Red Rivers flow generally east, down the long inclined plane of the Great Plains. While the Colorado occupies the bed of a depression, and flows nearly south, its branches flow nearly at right angles to it and to the

ranges, many of which are encountered and cut through without deviating from their direct courses. Another well-marked example is the Humboldt River, in the western portion of the Great Basin, which pursues a course somewhat south of west, cutting across a number of ranges which stand across its path. This apparently inexplicable conduct of the larger streams, in cutting their way across seemingly impassable obstacles, when easier paths are in many places offered to them, is simply explained when one reflects that the rivers had the prior right by possession, and that streams are extremely tenacious of their courses,—that, in short, streams live longer than mountains. The streams were there first, and as the mountains were slowly evolved from the plateau, the streams, like huge saws, cleft their way through the rising mass, preserving thus not only their general courses, but, in many cases, even the details of their meanderings. Of this class of orographic phenomena the Cordilleran region affords the physical geographer very many fine examples. Very rarely has a stream been driven from its original course except by violent catastrophic action.

2. *Climate of the Cordilleran Plateau.*

To obtain a good general idea of the climate of this region, it must be considered as a whole, disregarding, for the moment, the local effects of the many mountain ranges which diversify its surface.

Starting at the 100*th* meridian, in the United States, and ascending the gradual slope of the plains, we shall find the climate gradually growing more and more arid, and the rainfall correspondingly less. Still going westward, we see this aridity continually increasing, and its attendant phenomena correspondingly being intensified

until it reaches a maximum at the eastern base of the Sierra Nevada and Cascade Range of the Pacific States. This aridity is necessarily modified by the temperature, whether differences of the latter be caused by latitude or altitude; hence we find that points in the same longitude, and having the same elevation, but differing in latitude, have different degrees of aridity of atmosphere and soil, due mainly to the difference in amount of evaporation. The mean annual temperature of this region is abnormally low, but by no means as low as the elevation would presuppose. There is a great range of temperature between day and night, the maximum thermometer often indicating 80° to 90° Fah. in the shade, while twelve hours later ice may be forming. Still, owing to the dryness of the atmosphere, there is little or no dew deposited at night. Decomposition of animal or vegetable remains is almost unknown. Dead carcases dry up. Meat may be preserved for an indefinite time, without the use of antiseptics, simply by drying in the sun ("jerking"). A large part of the snows of winter evaporate directly (apparently without going through the process of melting).

The rainfall, while light, and constantly decreasing westward, changes in character, from the long storms of the Mississippi Valley and the Atlantic slope, to that of sudden explosive showers, of short duration and great violence. These characteristics of the climate have modified the surface, through erosion, in a peculiar and marked manner, of which more hereafter.

These are the general characteristics of the climate. In detail it is modified by the local topography to a marked extent. Every valley differs from its neighbour in some respects. The two sides of a valley may differ from one another distinctly in rainfall.

The causes of these peculiarities of climate are simple.

and are similar to those in many other parts of the surface of the earth. The prevailing air currents over this region are from the west, primarily from the Pacific Ocean. They come laden with moisture, and meet, not far from the Pacific Coast, that great continental barrier, the Sierra Nevada, and the Cascade Range. Forced upwards by this, they reach higher and colder regions, where they are chilled, and forced to disgorge their stores of moisture on the western slopes of these mountains. The Coast Ranges, which, within the United States, follow the Pacific Coast closely, lying west of the above-mentioned ranges, though much lower, also play no inconsiderable part in inducing precipitation, especially in the cold season. The result is that the western coast of the continent, especially in the winter, is extremely—nay, proverbially—well-watered; while the country to the eastward, the Cordilleran Plateau, suffers in consequence. The air currents, thus deprived of their moisture, blow as dry winds over the arid regions. Whatever moisture they may accumulate thereafter is taken from them in passing the numerous ranges which they successively encounter, producing on the mountains a more or less moist climate, especially on the western side of the crests; while the valleys, even at a distance of but a very few miles, may be utter deserts, where rain seldom or never falls.

3. *Natural Vegetation of the Cordilleran Plateau.*

The natural vegetation of this region is that peculiar to one placed under such climatic conditions. The plains are treeless, except along the few water-courses. For the most part they are covered with buffalo grass—a short, tufted, very nutritive grass, on which have pastured the vast herds of buffalo which formerly ranged over this

expanse. The more desert parts of the plains support artemisia, cacti, and the Spanish bayonet.

Among the mountains most of the valleys are found to be treeless, and with a vegetation similar to that of the plains, except that artemisia predominates at the expense of the grasses. Farther westward, in many localities, the conditions are too arid to support artemisia even, and great areas of sand or of glistening alkali greet the eye. As the character and extent of the vegetation depend upon moisture, so we find, in the same longitude, that the higher the latitude the less does the country resemble a desert.

The vegetation of the mountains illustrates this last point very well. The higher ones are timbered from the superior limit of timber down to their bases. The dryer and hotter the climate, and the lower the mountains, the more sparsely are they clothed with trees. A knowledge of these facts, with a hypsometric sketch of the country, would enable one to indicate with considerable certainty the distribution of timbered regions. The Cascade Range and Sierra Nevada are heavily timbered; so with the mountains of Northern Idaho, Western Montana, and North-western Wyoming. Most of the mountains of Colorado also are covered with timber, thinning out as we proceed southward into New Mexico. The Wahsatch Range and the higher ranges of the Great Basin are but sparsely timbered, while the lower ranges are covered only with low inferior timber or bushes.

CHAPTER V.

THE GREAT PLAINS.

1. *Their Physical Aspect.*

THE plains which form the eastern slope of the great Cordilleran plateau have no well-defined eastern limits, but shade imperceptibly into the prairies of the Mississippi Valley. They rise gradually, with a very uniform slope, towards the west. The surface is a monotonous, rolling, treeless expanse. The stream-beds are but slightly below the general level, and the water-partings between the streams are indicated only by broad swells in the surface. The landscape resembles the ocean in its long billowy undulations. There are no landmarks, and the mariner is no more dependent upon his compass and sextant than is the traveller upon this great expanse when away from the travelled routes.

Between latitudes 49° and 46°, the plains extend westward to longitude 112°, rising from 2000 feet above sea-level at the mouth of the Yellowstone to about 4000 feet at the base of the mountains, a mean slope of but 3·3 feet per mile. Farther south, in latitude 44°, the monotony of their surface is broken by the group of low mountains known as the Black Hills. At the foot of this outlying group, which rises to a mean height of 7000 feet above sea, the plains have an elevation of 3000 feet, having risen from the Missouri River at the more rapid rate of 7 feet per mile.

Southward from the latitude of the Black Hills, the base of the mountains is in approximate longitude 105°. In Colorado the elevation of the western edge of the plains rises with the South Platte River, from 5000 feet at the northern boundary of the State, to 7500 at the water-parting between the waters of this stream and the Arkansas. Thence it falls to 5000 feet at the debouchure of the Arkansas from the mountains, and thence gently rises and falls with the water-partings and valleys as far as the valley of the Canadian.

Along the line of the Platte and its north fork, the slope of the plains is about 8 feet per mile; while along the Arkansas it is 10 feet, showing a marked increase in rate of slope in going from the north southward.

2. *The Llano Estacado.*

South of the Canadian River, the Llano Estacado, or Staked Plain, forms a marked departure from this uniform slope. This is a great, waterless, well-grassed, table-land, having an elevation above sea of 3000 to 5000 feet, its greatest height being on its western and northern borders. On the west it descends by steep bluffs to the valley of the Pecos, a branch of the Rio Grande, which separates it from the mountains; on the north it falls with an equally abrupt descent to the valley of the Canadian. On the east and south the descent is less steep, but decidedly more rapid, than the slope of the plains. No streams flow across it, but in its slopes head most of the streams of Texas, and many small branches of the Canadian.

Its name is derived from the fact that the few springs and water-holes on its surface were, in the days of Spanish occupation, marked by stakes or long poles for the guidance of travellers.

3. *The Plains in British America.*

North of the boundary between the States and British America, the width of the plains diminishes rapidly, and in a few degrees the low lacustrine region extends very nearly to the base of the mountains. Their physical aspect, though modified by the increasing latitude, remains much the same as the portion which we have been considering.

4. *Bad Lands.*

"Bad lands" are found in many localities over this western country, and some sections of the plains present us with very fine examples of this peculiar feature. On White River, a western branch of the Missouri, in latitude 44°, there is a large area, and another covers a great extent of country on the Lower Yellowstone and the Little Missouri. The rock formation here is a soft, friable, argillaceous shale, which disintegrates readily on exposure to the elements. The surface is covered with a deep bed of soft powdery clay, the product of disintegration, from which rise cliffs, turrets, towers, indeed all sorts of architectural forms, sculptured by the chisel of nature from the soft yielding material. Indeed, the resemblance to some half-buried city of mediæval times is so great that some localities have received names expressing this likeness. For years "Goblin City," in Western Colorado, has had a place on the maps. To make the resemblance still more striking, these old ruined cities have had their inhabitants, who are buried with them. Everywhere we find their remains the bones of those ancient tertiary inhabitants, the gigantic saurians, pterodactyls, etc.

5. *Vegetation.*

The natural productions of the plains are primarily buffalo grass, and in the southern portion grama grass.

These cover the surface everywhere, except in the most barren localities. Besides these, various species of *artemisia*, or "sage brush," the commonest being *A. tridentata*, the prickly pear (*Opuntia*), and other species of *cactus*, and the *Yucca* or Spanish bayonet, are found in some abundance in the more arid localities.

Except in narrow belts along the streams, arborescent vegetation is almost entirely wanting in the whole region. It is one vast pasture, which, in time gone by, has given sustenance to countless millions of buffaloes and other wild game, and which will, in the future, supply the beef markets of the world.

The quality of the pasturage varies greatly, however, in different parts. Near the mountains, it is everywhere excellent, owing to the fact that the country is well watered by the numerous small streams. In the eastern part of Montana, and north-western part of Dakota, the grazing is poor. The surface is mainly covered with sage and *cacti*. Then there are several large areas of "Bad Lands," as was noted above.

Again, large areas which are well grassed are rendered useless by the scarcity of water; this is notably the case with the Llano Estacado of Texas and New Mexico, also on the Jornado del Muerto, in New Mexico, east of the Rio Grande, where there is practically no water whatever.

Still, there is an area of pasture land on the plains which is practically inexhaustible, and which is yet scarcely touched, although the cattle which range there are already numbered by hundreds of thousands.

6. *The Fauna—The Buffalo.*

When we mention the plains, the buffalo is immediately suggested.

The buffalo, or more properly the American bison (*Bison Americanus*), formerly ranged over the larger part of the Continent, being restricted on the eastward only by the Alleghanies, and on the north by the increasing cold of the higher latitudes. Now, its range is practically restricted to the plains, and the roads and railroads intersecting the latter are fast limiting its home to small and unfrequented localities in the far north and south.

They are, as is well known, gregarious animals, and formerly ranged over the plains in herds of almost fabulous number. Mr. J. A. Allen, the well-known American naturalist, in his *History of the American Bison*, says:—"At times, herds have been met with of immense size, numbering thousands, and even millions, of individuals. The accounts given by many veracious travellers respecting their size sound almost like exaggerations. Herds were formerly met with extending for many miles in every direction, so that the expression, 'so numerous as to blacken the plains as far as the eye can reach,' has become a hackneyed description of their abundance. Some writers speak of travelling for days together without ever being out of sight of buffaloes, while it is stated that emigrant trains were formerly sometimes detained for hours by the passage of dense herds across their routes. In the early history of the Kansas Pacific Railway it repeatedly happened that trains were stopped by the same cause."

Now all this is changed. Since the railroads penetrated the buffalo country, they have been slaughtered wholesale for their hides only. The destruction has been enormous, and, unless soon checked, the species will be-

come extinct in a few years. Where formerly these immense herds obstructed the way, now only a few scattered individuals are seen. A careful estimate from existing data gives us the number of these animals killed between 1870 and 1875,—about two and a half millions annually.

The methods of hunting this huge bovine are thus described by Mr. Allen:—"The two modes of hunting the buffalo chiefly practised at present are the pursuit on horseback and the 'still hunt.' The first-named is the one usually chosen where sport and excitement are the things mainly desired, the still hunt being practised when a supply of meat or of hides is the object. The latter method affords but little excitement, and entails, with proper precautions, little or no risk of life or limb on the part of the hunter. Parties hunting for pleasure prefer the chase on horseback, shooting from the saddle with heavy revolvers at close range, when at full gallop. Success depends almost wholly (provided the hunter is a good rider) upon the speed and bottom of his horse, and is really about as noble sport as attacking a herd of domestic cattle would be. The chase on horseback of a drove of Texas cattle would be far more dangerous, and attended probably with as much excitement, except that in the case of the buffalo the hunter has the consciousness of pursuing a nominally wild animal, and hence legitimate game. That the chase on horseback affords the wildest excitement is an undeniable fact. The swift pursuit of the flying mass of buffaloes, the mingling with the terrified herd, the singling out of the victim, the rapid shots at the huge moving bulk of hair and flesh, at so close range that the game is almost within reach of the hand, the tottering fall or headlong tumble of the doomed animal, the risk of pursuit by a wounded bull maddened with pain, the general din and confusion, with the double

BUFFALO-HUNTING

To face page 52.

risk of collision with the blind fleeing monsters, or of being thrown by treacherous marmot or badger holes . . . can, of course, yield only excitement of the intensest kind, both to the rider and his steed. . . .

"The still hunt is far more fatal, and is the method adopted by the professional hunter. . . . The buffalo being naturally unsuspicious and sluggish, even to stupidity, is readily approached within easy range, even in a level country, where the slight herbage of the plains is the only shelter. . . . The chief precaution necessary is to keep to leeward of the herd, in order not to give them the scent. . . .

"The professional hunter, when desiring to load his teams with meat, will rarely make his first shot at a greater distance than fifty or seventy yards. If the shot result fatally, the herd rarely moves more than fifty yards before stopping to look for the cause of the mishap to their fallen companion. . . . Here others fall before the hunter's shots; the herd, again slightly startled, moves on a few paces, and again stops to gaze. The hunter, still keeping prostrate, approaches if necessary, and continues the work of destruction. The shots are thus often repeated, till fifteen, twenty, or even thirty buffaloes are killed before the herd becomes thoroughly alarmed, and, in hunter's parlance, 'stampedes.'"

Elk (wapiti), antelope, and several species of deer, are abundant on the plains from autumn to spring, when they retire into the mountains for the summer.

In the frozen regions of the far north the buffalo is replaced by the musk-ox and the antelope by the reindeer.

A curious animal, popularly known as the prairie dog (Cynomys), is very abundant all over the plains. It is a burrowing animal, about the size of a large gray squirrel, living in communities, some of which contain thousands of individuals. Many of their villages cover a

number of square miles each. The surface resembles a newly-planted cornfield, being covered with little mounds of earth, each indicating the home of a family. On each mound sits a prairie dog on his haunches, like a kangaroo, and greets the intruder with a chorus of short piping barks. They are shy little fellows, and, on a nearer approach, they make a dive for their holes, and, with a short quick wriggle of their hinder parts, disappear.

Living with them in their villages, and tolerated perforce, are rattlesnakes (*Crotalus*), and a small species of owls who make a good diet off the young of their hosts.

7. *Geology of the Great Plains.*

From Archæan time to the end of the Cretaceous period this was a region of deep seas. In early Palæozoic time it was covered by the ocean that spread continuously over almost the entire region of the United States. Its expanse was interrupted only by a few islands in the region of the Rocky Mountains, and a few embryonic mountain ridges in the Appalachian region.

In Mesozoic time the "Plains" were covered by the great Mediterranean Sea, which extended from the Gulf of Mexico to the Arctic Ocean. In Tertiary time the surface was marked by a series of great fresh-water basins. The fauna and flora of the lake deposits of the plains are of the same age as those on the west side of the Rocky Mountains. During the Middle Tertiary the continental surfaces were broad and covered with a vegetation very much like that of the present day, although the climate was much milder than now. Over the western plains "roved great herds of quadrupeds, rivalling in number and variety those that have struck with wonder and surprise the traveller in South Africa." The following picture of North America during the Tertiary age is drawn by Pro-

PRAIRIE DOG VILLAGE

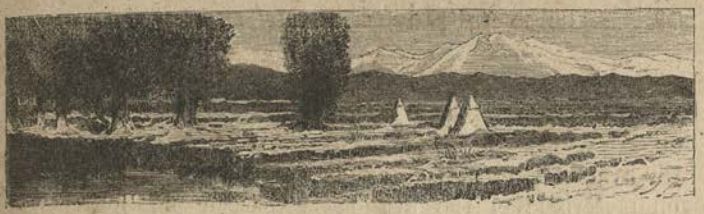
To face page 54

fessor Newberry in Hayden's *Annual Report* for 1870 :—

"Then a warm and genial climate prevailed from the Gulf to the Arctic Sea; the Canadian highlands were higher, but the Rocky Mountains lower and less broad. Most of the continent exhibited an undulating surface, rounded hills and broad valleys covered with forests grander than any of the present day, or wide expanses of rich savannah, over which roamed countless herds of animals, many of gigantic size, of which our present meagre fauna retains but a few dwarfed representatives. Noble rivers flowed through plains and valleys, and sea-like lakes, broader and more numerous than those the continent now bears, diversified the scenery. Through unnumbered ages the seasons ran their ceaseless course, the sun rose and set, moons waxed and waned over this fair land; but no human eye was there to mark its beauty, nor human intellect to control and use its exuberant fertility. Flowers opened their many-coloured petals on meadow and hillside, and filled the air with their perfumes, but only for the delectation of the wandering bee. Fruits ripened in the sun, but there was no *hand* there to pluck, nor any speaking tongue to taste. Birds sang in the trees, but for no ears but their own. The surface of lake or river was whitened by no sail, nor furrowed by any prow but the breast of the water-fowl; and the far-reaching shores echoed no sound but the dash of the waves and the lowing of the herds that slaked their thirst in the crystal waters.

"Life and beauty were everywhere, and man, the great destroyer, had not yet come; but not all was peace and harmony in this Arcadia. The forces of nature are always at war, and redundant life compels abundant death. The innumerable species of animals and plants had each its hereditary enemy, and the struggle of life was so sharp and bitter that in the lapse of ages many genera and species were blotted out for ever.

"The herds of herbivores—which included all the genera now living on the earth's surface, with many strange forms long since extinct—formed the prey of carnivores commensurate to these in power and numbers. The coo of the dove and the whistle of the quail were answered by the scream of the eagle, and the lowing of herds and the bleating of flocks come to the ear of the imagination mingled with the roar of the lion, the howl of the wolf, and the despairing cry of the victim. Yielding to the slow-acting but irresistible forces of nature, each in succession of these various animal forms has disappeared, till all have passed away or been changed to their modern representatives; while the country they inhabited, by the upheaval of its mountains, the deepening of its valleys, the filling and draining of its great lakes, has become what it is."



THE ROCKY MOUNTAINS.

CHAPTER VI.

THE ROCKY MOUNTAINS.

1. *General Divisions of the Cordillera System.*

For purposes of description this great region may be divided into the following parts, which differ from one another sufficiently to make it a natural subdivision.

1*st.* The Rocky Mountains, which embrace the mountain region of Montana, Idaho, Wyoming, Colorado, and New Mexico, with so much of the eastern range as exists in the British Possessions.

2*d.* The plateau regions drained by the Colorado River and its tributaries.

3*d.* The Great Basin, with its complex system of ranges.

4*th.* The Pacific Coast Ranges, including the Sierra Nevada, Cascade, and Coast Ranges of the Pacific States, and the extension of the Cascade Range through British Columbia and Alaska.

2. *The Northern Section of the Rocky Mountains in the United States.*

Orographically, the Rocky Mountains are divided

into two parts by a break in the system in Southern Wyoming, where, from the southern end of the Wind River Range to the northern end of the Park Ranges, the system is represented only by elevated plateaus. The characteristic of the system is that of parallel chains, trending somewhat west of north. In Northern Montana the Missouri Range faces the plains from the boundary southward to the 46th parallel, and carries the continental water-parting. East of it the monotony of the plains is broken only by a few groups of hills, which, from their isolated position in a flat country, have been, in some cases, honoured beyond their deserts by being called mountains. Among them are the "Little Rocky," the "Bear's Paw," etc.

West of the Missouri Range rises Clark's Fork of the Columbia, which pursues a devious course among the many mountain spurs which obstruct its passage, and is finally driven far to the north-west to escape from the mountain maze by which it is surrounded. It finally finds a passage through the second great range of the system, the Bitter Root or Cœur d'Alène, in the southern part of British Columbia. This range trends south-eastward, parallel to the Missouri Range, and at the end of the latter is connected with it by a low broad saddle, known as the Deer Lodge Pass. South of this point the continental water-parting is carried by the Bitter Root Range to its end in latitude 44°. The depression between these two ranges is filled with short ranges trending parallel to them, and contains several fine large valleys, valuable for agriculture and cattle-raising.

The Missouri and Bitter Root Ranges reach altitudes in the peaks of upwards of 9000 feet, and probably the average height of the ranges is in the neighbourhood of 8000 feet. They are crossed at a number of passes at elevations ranging from 5500 to 6500 feet.

THE YELLOWSTONE NATIONAL PARK.

English Statute Miles, 10 to 1 Inch.

F.—Fall. Spr.—Springs. G.—Geysers.
Heights above the Sea in English Feet.

London: Edward Stanford, 55, Charing Cross.

West of the Bitter Root are several detached ranges, some of considerable extent, as the Salmon River Mountains, which consist of a succession of two or three ranges parallel to the Bitter Root.

In latitude 45° 56′, longitude 111° 34′, the Missouri River divides into three large streams, known respectively as the Jefferson, Madison, and Gallatin Rivers. These branches head far to the southward, meeting there the head-waters of the Snake, or Lewis' Fork of the Columbia. In the same locality heads the Yellowstone, a large branch of the Missouri, in a great lake, at an elevation of 7738 feet above sea-level.

3. *The Yellowstone National Park.*

The country about the heads of the Madison, Yellowstone, and Snake Rivers, in the north-western part of Wyoming, seems to have been set aside by the Great Maker for the exhibition of the action of volcanic forces. In time past, but geologically very recent, this region has been repeatedly covered by floods of lava; great ranges of mountains have been built by catastrophic action; and to-day we find these forces still actively at work, as evidenced by the innumerable hot springs and geysers which are found all over the surface. Before the geysers of the Yellowstone National Park, all others of the world—even the celebrated ones of Iceland—sink into insignificance.

Until a very recent period this country was a *terra incognita*, save from the vague tales of Indians and white hunters and trappers, and these wonders were scarcely suspected. Deterred by the difficulties of approach, many exploring parties have passed by this region. It was not until 1864 that any authentic account of any part of this country was obtained. In that year a prospecting

party, under the leadership of Captain W. W. De Lacy, penetrated the western edge of this region, and by accident came to what is now known as the Lower Geyser Basin, near the head-waters of the Madison River. The accounts of this discovery, however, attracted little attention; but in 1870 a party was organised in Montana to test the truth of these stories. This party, under the leadership of General Washburn, then the Surveyor-General of Montana, discovered most of the wonders of the region, and

YELLOWSTONE NATIONAL PARK.

published them to the world in the pages of Scribner's *Monthly Magazine*. During the two following years, 1871 and 1872, the region was thoroughly explored by the parties of the U.S. Geological Survey of the Territories, and the results were officially published by the Government; and in the winter of 1871-2 the region embracing these wonders was set off by Congress as a national park.

This park contains about 3500 square miles. It is mainly a high rolling country, covered by a dense growth

of coniferous timber. Several small groups of mountains diversify its surface, and along its eastern border stretches a high, rugged, volcanic range, separating the waters of the Yellowstone from those of the Big Horn. The average elevation of the Park is about 8000 feet above sea-level, an elevation which gives it an almost arctic climate. For nearly nine months of the year snow lies on the ground, and frost is liable to occur even in midsummer nights. The month of September usually ushers in the winter.

HOT SPRINGS, YELLOWSTONE VALLEY.

4. *Geysers and Hot Springs.*

Hot springs are found in innumerable localities throughout the Park. They are omnipresent. Among the dense timber, on the plateaus, in the valleys, on the walls and at the bottoms of cañons, on mountain slopes and even at the summits,—yes, even in the beds of lakes and rivers,—they are found. With their deposits they have built mountains, as at the White Mountain Springs,

or have floored whole valleys, as in the Geyser Basins of the Firehole or Madison River. They are of all sizes, from a few inches in diameter to areas of several acres of hot water—of all temperatures, from tepid to boiling. Associated with these springs, at a dozen or more locali-

GEYSER IN THE YELLOWSTONE NATIONAL PARK.

ties, are active geysers, throwing columns of boiling water, in extreme cases, 200 feet in height. Altogether there are known to be fifty geysers within the Park.

Let us glance at a few of the principal groups of springs and geysers.

5. *The White Mountain Springs.*

Leaving the settlements at Bozeman, Montana, and following up the Yellowstone River to the Park,—which, by the way, is the usual route to "Wonderland,"—the first group of springs which arrests attention on entering the Park is that of White Mountain or the Mammoth Springs. These springs are highly charged with calcareous matter, which they deposit, on cooling, in marvellous quantity. On approaching them the visitor beholds a hill, 200 feet in height, of dazzling whiteness, with its sides striped with bands of vivid red and yellow. This hill is the work of the springs, which burst forth upon its summit and pour their waters down from basin to basin upon its sides. The steep sides of the hill are ornamented with a series of semicircular basins, with margins varying in height from a few inches to 6 or 8 feet, and so beautifully scalloped and adorned with a kind of bead-work, that the beholder stands amazed at this marvel of Nature's handiwork. Add to this a snow-white ground, with every variety of shade of scarlet, green, and yellow, as brilliant as the brightest of our aniline dyes. The pools or basins are of all sizes, from a few inches to 6 or 8 feet in diameter, and from 2 inches to 2 feet in depth. As the water flows from the spring over the hill-side from one basin to another, it loses continually a portion of its heat, and the bather can find any temperature he desires. At the top of the hill there is a broad flat terrace, covered with these basins, 150 to 200 yards in diameter. Here are the active springs. The largest one is near the edge of the summit. It is 25 by 40 feet, and the water is so perfectly transparent that one can look down into the blue ultramarine depth to the bottom.

The ruins of extinct springs tell us that we see now

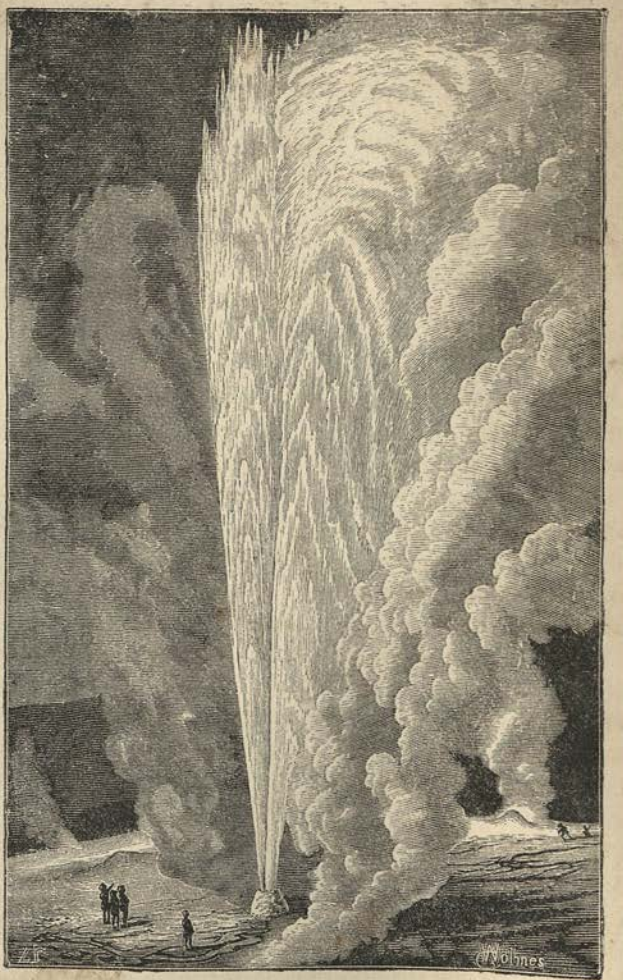
only the lingering remains of an enormous past activity. Everywhere in the neighbourhood, for miles in all directions, are the calcareous deposits of extinct springs, some yet naked of vegetation, but most of them covered with soil and trees. Many cones of this formation, self-built mausoleums of hot springs, are to be seen. The most prominent of these is known as the "Liberty Cap," a cone 50 feet in height, and about 20 feet in diameter at the base.

6. *The Upper Geyser Basin on the Firehole River.*

Near the head of the Madison River, which here is known as the Firehole, are two small valleys, one containing a dozen, the other about twenty square miles, in which is the greatest collection of hot springs and geysers in the region. Of these the upper contains the greatest number and the most active geysers. Imagine a valley shut in by high bluff walls, its bottom floored throughout with a hard white glistening crust of silica, the deposit from the almost innumerable hot springs and geysers which dot its surface. Through the middle of the valley flows a small river, whose water is rendered tepid by the contributions of the geysers.

In this valley there are no less than eighteen true geysers, most of which throw water to a considerable height. Some of them are irregular in their periods, others doubly periodic, having two or more eruptions at short intervals, and then taking a long rest. The following descriptions give the chief facts in regard to the principal of these geysers. The heights given are the maximum heights measured.

These descriptions are taken mainly from the writings of Dr. A. C. Peale, in the *Report of the Geological Survey of the Territories for* 1872.



BEEHIVE GEYSER. *To face page 65.*

OLD FAITHFUL.—The mouth of this geyser slopes inward, and measures on the outside 8 feet by 4. Its crater is a mound of geyserite, which rises 12 feet above the surrounding level. The eruptions of this geyser commence with a few abortive attempts, followed by a rapid succession of jets, which soon reach a maximum, and then gradually decrease, followed by a short discharge of steam. The average length of an eruption is about five minutes, and the period of inactivity one hour and three minutes. The maximum measured height of the column of water is 130 feet. This is one of the finest and most regular of all the geysers of the region.

THE BEEHIVE.—This geyser is recognisable at once by its cone, which has the form of an old-fashioned beehive, three feet in height and about seven in diameter at the base. It is coated with beautifully-beaded formations, which have an almost pearly lustre. The eruptions are very fine, and are peculiar to this geyser. The water and steam issue from the orifice in a steady stream instead of successive impulses. The greatest measured height of the column of water is 178 feet, while the steam has been forced 193 feet into the air. During the eruptions the pent-up steam shakes the earth around with mighty throbs. The period of this geyser is irregular, as is also the duration of its eruptions.

GIANTESS.—This geyser has a huge basin, 23½ by 32½ feet across. It is rather a great pool, which, were it not for its rarely-occurring eruptions, would be mistaken for a quiet hot-spring pool, of which there are many in the basin. When in eruption it throws a great mass of water to a small height, surging and splashing in all directions. The greatest height of the water, which was

measured, was 39 feet, while the steam was forced up 69 feet. This geyser seems to be doubly periodic, having a succession of three eruptions at intervals of about an hour, and then a rest for a long period, whose duration has not been ascertained.

CASTLE.—This has the largest and most noticeable craters in the basin. The immediate crater is on a platform, 75 by 100 feet, which is 3 feet above the surrounding level. Above this platform it rises about 12 feet. It is 120 feet in circumference at the base, and 20 feet across at the top. The orifice of the geyser tube is circular and 3 feet in diameter, and its throat is lined with large globular masses, of an orange colour and beautifully beaded, as is so universally seen throughout the Geyser Basins.

An eruption commences with jets of water, at the rate of about twenty per minute. These last for about fifteen minutes, and are succeeded by steam mingled with spray, which escapes with a sort of pulsating movement. This soon changes to a steady escape, when it seems as though the water were exhausted, and steam was being forced out as rapidly as possible. This again changes, and steam escapes in cloud-like masses with a roaring sound, like the escape-steam from some vast escape-pipe. Then this gradually dies away, and the eruption is ended, having lasted about an hour and twenty minutes.

The maximum measured height of the water column is 93 feet, of steam 115. The character of the period of this geyser has not been ascertained.

GRAND GEYSER.—This geyser has no raised cone, only a basin sunk below the general level, like that of a quiet spring. It is 52 feet in diameter. In its centre is the geyser tube, which measures 4 feet by 2. The greatest

measured height of an eruption was 173 feet. Its periods seem to be irregular.

The eruption consists of three distinct periods of action, after each of which the water sinks completely out of sight, and water overflows from the Turban Geyser, which is in immediate proximity, into the basin of the Grand. The mass of water carried up is enormous; while through this main mass a smaller column shoots at intervals to a much greater height.

TURBAN GEYSER.—This neighbour of the Grand, though one of the minor geysers, is distinguished by its uniquely beautiful crater. Its sides and bottom are covered with yellow globular masses, which resemble nothing more than huge pumpkins. Its maximum height of eruption is 25 feet.

GIANT GEYSER.—This geyser, which in 1871 was one of the most active in the basin, has since, so far as known, ceased active operations. Its crater is one of the most noticeable in the basin. It is a high ragged cone, 10 feet in height.

GROTTO GEYSER.—The crater of this geyser is a large irregular mass of geyserite, 53 feet in length and 26 in width. It has two openings, through which water is discharged diagonally upwards, the columns from the two openings crossing one another. Its maximum height of eruption is about 40 feet.

There are several other beautiful geysers in this basin, but they are not so distinguished from the above as to merit a detailed description. Among them may be mentioned the Riverside, Sawmill, Fan, Soda, Trinity, and others.

7. *Lower Geyser Basin on the Firehole River.*

This basin, which is situated about 10 miles below the Upper Basin, covers a much larger area than the latter, occupying about 20 square miles. Though it contains several fine geysers, still it is distinguished rather by the size, number, and beauty of its quiet hot springs than by the activity of its geysers. Of the latter, the finest by far is that known as the Architectural. The following description is from the pen of Mr. W. H. Holmes in the *Report of the Geological Survey of the Territories for* 1872, p. 144:—

"In approaching the crater of this geyser, the observer is not at first impressed with its importance, as the outer rim of the basin, or rather table—in the centre of which the fissure is situated—is raised but two or three feet above the general level. . . . The surface, formed entirely of siliceous deposit, is diversified by an infinite number of forms and colours. The depressed parts in some places are so level and white and hard, that a name could be engraven as easily and as well as upon the bark of a beech tree. In others, there are most exquisitely-modelled basins and pockets, with ornamented rims, and filled with perfectly transparent water, through which thousands of pebbles of white geyserite could be seen lying on the velvety bottoms. Rising above the general level are innumerable little masses and nodes of cauliflower-like and beaded silica, standing out of the shallow water like so many islands. Those near the crater swell into very large rounded masses. The whole surface is so solid that I walked, stepping from one elevation to another, up to the very brink of the fissure, where I looked down with no little apprehension into the seething caldron, where, 12 or 15 feet below, was a mass of dark green water in a state of constant agitation, threatening an eruption. The crater

is about 10 feet in diameter, lined with an irregular coating of beaded silica. The water soon began to rise, plunging from side to side in great surges, sending up masses of steam, and emitting angry rumbling sounds. . . . An irregular mass of water was thrown into the air in the utmost confusion, spreading out at every angle, and whirling in every direction, some jets rising vertically to the height of 60 or 80 feet, then separating into large glistening drops, and falling back into the whirling mass of water and steam; others shooting at an angle of 45°, and falling upon the islands and pools 30 or 40 feet from the base. The eruptive force—for a moment—dies away, and the water sinks back into the tube. Then, with another tremendous effort, a second body of water is driven into the air, but with a motion so much more simple than before, that the whole mass assumes a more regular form, and is like a great fountain with a thousand jets, describing curves almost equal on all sides, and forming a symmetrical whole, more varied and more grand than any similar work by man. The intermittent action continues for nearly an hour, but is so constantly changing that at no two moments during that time are the forms or movements the same."

Of one of the hot springs in this basin Mr. Holmes writes: "On the upper side of the spring, next to the bank, the water—in overflowing—ran into large shallow pools, painting whatever it touched with the colours of the rainbow. Beds of rich creamy white and rich yellows were interlaid with patches of siennas and purples, and divided up and surrounded by the most fantastic patterns of delicate grays and rich browns. On the side next the creek the running water has made a network of streams. In those where the water is still hot, the colours are bright, varying from a creamy white to the brightest yellows; but as the water becomes cooler farther down, the

colours grow darker and richer, the siennas greatly predominating; while the basins of the larger pools are stained with still darker colours, frequently of a purple tint, and reflecting the picturesque groups of pines on their dark surfaces."

8. *The Shoshone Geyser Basin.*

A third large collection of geysers and hot springs is found at the west end of Shoshone Lake. This basin, rarely visited by white men, contains ten geysers, besides large numbers of hot springs. Of the geysers, the finest is that known as the Union, so named because it combines in one nearly all the phenomena of the species. It is thus described by Professor Frank H. Bradley in the *Report of the Geological Survey for* 1872, p. 245:—

"It has three vents standing closely in a row, each of which has built up a small mound, beautifully beaded without and pointed within. . . . During eruptions the west vent spouts a little water, two or three feet high, for one or two minutes, and then yields a moderate flow of steam. Meanwhile the centre vent is throwing a very powerful jet from 70 to 90 feet into the air, which, after about five minutes, gradually gives place to steam, the mingled steam and water giving the highest jets. The east vent, spouting 10 to 50 feet, throws a solid body of water for about ten minutes, when the whole supply of water seems to become exhausted, and the rush of steam from all the vents becomes more violent, and continues some forty or fifty minutes longer, gradually declining, however, though with many spasmodic renewals."

This geyser seems to be irregular in its periods.

9. *The Minute Man.*

This active little geyser has a double period, playing at intervals of two or three minutes for several hours, and then resting for about the same length of time. It throws a confused mass of water 30 or 40 feet into the air, the eruption lasting but a few seconds.

10. *Red Mountain Springs.*

On the shores of Heart Lake, and extending for two or three miles up a small tributary to this beautiful lake, is a collection of fine springs, having among them several geysers of importanee.

11. *Gibbon Geysers.*

In the neighbourhood of the Gibbon River, a large eastern branch of the Madison, there are a number of fine geysers. Part of them are grouped in a "basin" with a large collection of hot siliceous and sulphur springs, while others are scattered about on the steep mountain-sides, or hidden in the depths of the primeval forest, where their existence would never have been suspected, had they not betrayed themselves by the immense columns of steam which they periodically send up.

12. *Yellowstone Geysers.*

At the Crater Hills, on the Yellowstone, near the great lake in which this river heads, is a fine collection of boiling sulphur springs, and a few miles farther up the river is a group of geysers, where boiling mud is ejected. The principal one of these throws its muddy waters to a height of about 40 feet. Its eruptions take

place at intervals of about four and a quarter hours, the eruption lasting about twelve minutes.

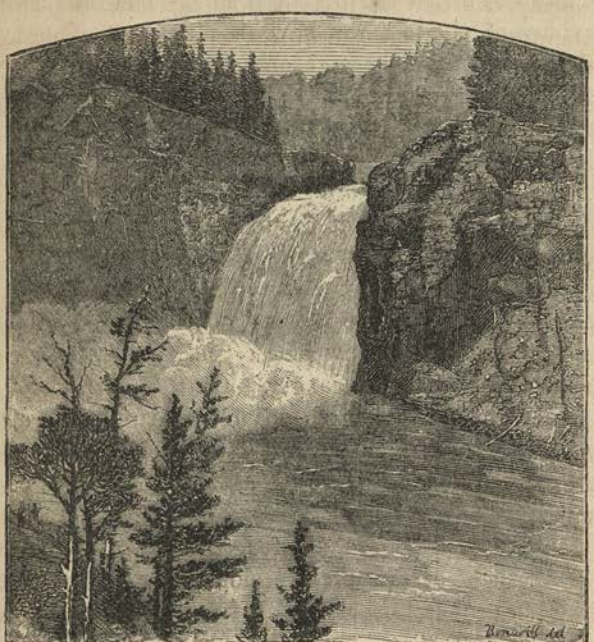
On the west shore of Yellowstone Lake is a spring which originally burst forth from the bed of the lake, but has built for itself a cone, which now rears itself above the surface of the water. Standing upon the flat cone of this spring, one can catch trout from the lake, and, swinging them into the boiling caldron, he can cook them upon the hook.

From this it is known as the "Fish Spring."

13. *The Grand Cañon and Falls of the Yellowstone.*

Hot springs and geysers are not the only objects of interest in this region, for Dame Nature, ever lavish of her treasures, has richly endowed this country. Its mountains, waterfalls, and cañons, are well worthy of a momentary glance. The Yellowstone River, from the lake at its head to its point of exit from the Park, presents the traveller with an ever-changing panorama of scenes. Leaving the lake, for several miles the river is broad, flowing with a gentle current between high wooded banks. Soon, however, rapids intervene, the river-bed becomes narrow and broken up by huge rocks; the river roars tumultuously along, down a steep broken incline and shoots over a precipice 112 feet in height. This is the Upper Fall. Recovering itself after this ebullition the great river moves quietly along its course for a half-mile, and then suddenly rolls over a sheer precipice 300 feet in height, into the depths of the Grand Cañon, down whose sinuous course it roars and tears along, an emerald-green band, flecked with snowy foam, between the deeply coloured walls of the cañon. Of the Lower Fall and the Grand Cañon, Dr. A. C. Peale writes as follows in the above-quoted *Report of the Geological Survey*, p. 132:

"The river suddenly narrows to a width of only 100 feet, and rushes over a ledge of trachyte, falling (300 feet) to the bottom of the cañon. The water at the edge of the fall is very deep, and of a deep green colour. . . . When we approach the brink and look over into the abyss, we begin to realise the littleness of man in the presence



UPPER FALLS, YELLOWSTONE RIVER.

of Nature's grand masterpieces. Down, down goes the whirling mass, battling and writhing as the water dashes against the rocks with a noise like the discharge of artillery. Here and there a resisting rock is met with, and the water rebounds, broken into myriads of drops, which throw back to us the sunlight resolved into its primitive colours. The bottom of the cañon reached, the immense

mass of water seems to dissolve itself into spray, and then recovering, it flows down the gorge an emerald-green stream, dashed with patches of white, beating with furious waves the rocky walls that imprison it. Taken in connection with the varied tints of the cañon itself—red, yellow, orange, white—the dark green pines fringing the top, and the bright green of the spray-nourished moss on the sides of the fall, we have a picture of almost unequalled magnificence and grandeur. It is a scene of which one never tires, and in the description of which language fails."

The Grand Cañon is a gorge some 20 miles in length, cut in a volcanic plateau. It has a depth of 1200 to 1500 feet, and a width at the top in few places exceeding a half-mile. The walls are precipices or inclined at a fearful angle. The river flows in the sharp notch at the bottom. Access to the bottom of the cañon is to be found only at a very few places, and in those the climb is not unattended with danger. On the east side of the river a narrow crevice in the friable volcanic rock affords a way down to the foot of the fall, where, if the visitor desires a thorough shower-bath at Nature's hands, he can obtain it.

Hot sulphur-springs are found in the greatest abundance at the foot and on the slopes of the cañon-walls, adding the colours of their deposits to those of the brilliant volcanic rocks.

Half-way between the two falls a small stream, known as Cascade Creek, enters the river. Just before reaching the main stream, this creek makes a beautiful cascade, about 100 feet in height, over the basaltic pillars which border the river.

Passing around the cañon of the Yellowstone by a circuitous trail, crossing a high pass, nearly at timber line, in the Washburn Mountains, the visitor reaches the

river again at the mouth of Tower Creek, a large western branch. This, like most of the tributaries to the Yellowstone in this neighbourhood, flows at a much higher level than the river, and reaches its level by a fall. The fall on this stream is, in itself and its surroundings, particularly fine. Tearing along in a rapid course, it is suddenly contracted between two tall columns of volcanic breccia, whence it leaps over a precipice in an unbroken fall of 132 feet, into a deep, dark, gloomy gorge, where the sunlight never penetrates. The walls of this gorge are set with columns of breccia in bas-relief, which project above the top in tall needle-like spires.

This is a land of streams and waterfalls. On each of the three forks of Gardiner's River, on Gibbon's River, and the main Madison, and on Lewis' Fork of the Snake, are falls well worthy of the attention of the lover of nature in her wildest moods. It is, also, a land of lakes. From the summit of Mount Sheridan, the topmost peak of the Red Mountains, one overlooks a country diversified by mountains, hills and dales, and rolling plateaus, all densely covered with the dark black-green of coniferæ. In this magnificent setting he sees on every hand the deep blue-green of crystal lakes and lakelets. North of him Yellowstone Lake stretches its broad expanse, its long arms extending far inland, and holding mountainous promontories in its grasp; Shoshone and Lewis Lakes to the north-west, reflecting the rays of the afternoon sun; Heart Lake, a most beautiful gem, is at his feet; and, scattered about amid the primeval forests, are innumerable little lakelets.

Nor are these all the beauties or wonders of the Park. The mineralogist finds here unsurpassable treasures. Obsidian—black, red, and banded—is found in fabulous abundance; nearly all the varieties of quartz are found in profusion, and silicified wood encumbers the ground. In

many localities forests have been overflowed by streams of liquid rock, or overwhelmed by showers of volcanic ashes; and the forests thus covered have been gradually changed, particle by particle, into silicified wood, crystalline quartz, amethyst, and other like products. Nature, by erosion, has exhumed these vegetable Herculaneums, and we find great trunks and branches of trees scattered over the surface, or standing in place, or projecting in bas-relief from the faces of cliffs, but all changed to stone, as though at the sight of a Medusa's snaky locks.

At present the Park is not easily accessible to the average traveller. The usual route from the east is *vid* the Union Pacific and the Utah Northern Railroads, thence reaching Bozeman, Montana, by a long tedious stage-ride of three days and nights. This point is the last settlement, with the exception of a few ranches, and the traveller must henceforward be self-dependent. He must buy or hire saddle animals to carry himself and party, and pack-animals to transport provisions, tents, mess-kit, and other impedimenta. He must carry his provisions and rely upon his rifle for a supply of meat. Travelling in the Park is not unattended by difficulties. Heavy, well-beaten trails lead to many localities of interest, but when one leaves them he is like a mariner upon an unknown sea. Not only is the country rugged and somewhat mountainous, but it is so densely timbered that one may travel for days without being able to correct his "dead reckoning" by the sight of a single landmark. If the sun disappear, the traveller becomes dependent upon his compass. Moreover, very large areas of country are covered not only with a living growth of trees, but apparently all the timber that has lived and died there since the Flood has been heaped up, like huge jackstraws, to oppose his progress. Immense extents of country are so blocked with this fallen timber as to be totally impass-

able. Again, there are on the plateaus and in the valleys great areas of swamp, which are almost equally impassable.

14. *The Missouri Valley.*

The three forks of the Missouri are separated by short ranges, reaching heights of 8000 to 9000 feet above sea-level. About the point where the Missouri divides is a large beautiful valley, extending far up its branches, and known as the Gallatin Valley. It is well settled by a farming population.

Following the Missouri down from its forks, we find it meandering peacefully along in a broad bottom, its valley now wide, now shut in by high hills, while distant snowy mountains gleam in the sunlight.

15. *The Great Falls of the Missouri.*

Near Fort Benton the river apparently tires of the monotony of its course, and, after a few preliminary rapids, it enters the series of falls and cataracts which are known as the "Great Falls." Of these we find a very good description in the *Pacific Railroad Reports.* "There are five principal cascades: the first, of 25 feet fall, abuts three miles below the mouth of Sun River; the second nearly three miles below this, of 5 feet 11 inches; and immediately below it the third. Here, between high banks, a ledge, nearly as straight as if formed by art, runs obliquely across the river, and over it the waters fall 42 feet in one continuous sheet of 470 yards in width. Half a mile below this is the fourth, a small irregular cascade of about 12 feet descent. The stream then hurries on, lashed and churned by numerous rapids, about five miles farther, when it precipitates itself over a precipice 76 feet

high. The banks are high and abrupt on both sides, with deep ravines extending into the prairie for one or two miles both above and below it. Below the falls there is a succession of rapids, which become less and less frequent, to the mouth of Highwood Creek."

16. *The Wind River and Yellowstone Ranges.*

Passing now southward again, we find on the east of the Upper Yellowstone a high ragged range, extending from the bend of the Yellowstone southward to South Pass in latitude 42°. Its northern portion is known as the Yellowstone, its southern the Wind River Range. The latter separates the head-waters of Green River, a fork of the Colorado, from those of the Big Horn. It is one of the most rugged ranges on the continent, its crest being a line of spires, pinnacles, needles, and overhanging cliffs.

Its peaks range from 13,000 to nearly 14,000 feet in height, and many of them are totally inaccessible except to creatures with wings. There is but one pass in the range, which can be crossed by animals, and only during the four summer months, as during the rest of the year it is choked with snow.

In the year 1847, Captain J. C. Fremont, in command of an exploring expedition, succeeded, after three days of severe climbing, in scaling one of the highest peaks of this chain, a mountain 13,570 feet in height. This peak has since borne his name. Since that time the range has been practically untouched by the many exploring expeditions which have traversed the west, until the "Survey of the Territories," under Dr. Hayden, entered this field in 1877. During that and the following year the range has been surveyed in detail by this organisation. Its fastnesses have been traversed; its innermost secrets of

structure unfolded. Among other new phenomena made known to the world, the existence of living glaciers in the Rocky Mountains of the United States was demonstrated. Several small glaciers, both in this range, and in the Téton Range farther westward, were discovered. They are the ruins of glaciers on a magnificent scale which, in very late geologic times, this range sent down from its snow-capped peaks far out into the Green River Basin. To-day we see their remains in the form of great lateral and terminal moraines, running far up the mountain slopes and skirting each cañon, to a height of 3000 feet above the plain. The streams pursue devious and tumultuous courses through, over, and among the boulders of their terminal moraines, and all along the base of the mountains are beautiful crystal lakelets, whose beds were scooped out by the ceaseless grinding of the great ice-power. The lower slopes of the mountains are covered with "*roches-moutonnées*," whose polished surfaces show no signs of decay, and which are yet bare of soil, so recently have they been freed from their icy load.

17. *Snake River.*

The Snake, or Lewis Fork of the Columbia, heads in the Yellowstone National Park, opposite the heads of the Madison and Yellowstone Rivers. Its sources are in beautiful lakes, embosomed in heavily wooded hills. Flowing southward it soon enters a mountainous country, from which it receives several large tributaries—Barlow's Fork, Buffalo Fork, Gros Ventre Creek, and Hoback River. It washes the east base of the Téton Range, which rears its rugged Gothic spires 7000 feet above its valley. Turning to the west, the river cuts across the mountains which seek to check its course, in a terrific gorge, well nigh impassable. On the west side of these mountains it

enters upon a great field of basalt, a great volcanic plain, covered with drifting sand and seamed with crevasses like those of a glacier. This is known as the Snake River Plains. It crosses this plain by a southerly course, then gradually sweeping around to the westward, it hugs the southern border of this basalt field as far as longitude 117°, when it turns northward, then for a short distance westward again to its junction with Clark's Fork, making the mighty Columbia.

In its course across and around the basalt plain it is rapid and tumultuous, boiling and seething along, its bed broken by boulders and ledges. In several places there are noteworthy falls. The upper of these is the American Fall, at a point a few miles below the mouth of the Portneuf, where the "Mad" River, as it was called in early days, leaps over a wall of basalt 30 feet in height.

Some distance farther down is the Shoshone Fall, by far the greatest and finest on the river. This fall was visited in October 1868 by Mr. Clarence King, and I quote his fine description of it:—

"The wall of the gorge opposite us, like the cliff at our feet, sank in perpendicular bluffs nearly to the level of the river. A horizon as level as the sea; a circling wall, whose sharp edges were here and there battlemented in huge fortress-like masses; a broad river, smooth and unruffled, flowing quietly into the middle of the scene, and then plunging into a labyrinth of rocks, tumbling over a precipice 200 feet high, and flowing westward in a still deep current to disappear behind a black promontory. . . . Dead barrenness is the whole sentiment of the scene. . . .

"In plan the fall recurves up-stream in a deep horse-shoe, resembling the outline of Niagara. The total breadth is about 700 feet, and the greatest height of a single fall about 190. . . . The whole mass of the

fall is one ever-varying sheet of spray. In the early spring, when swollen by the rapidly melted snows, the river pours over with something of the volume of Niagara. . . . There are no rocks at the base of the fall. The sheet of foam plunges almost vertically into a dark, beryl-green, lake-like expanse of the river. Immense volumes of foam roll up from the cataract-base, and, whirling about in the eddying winds, rise often 1000 feet into the air. . . . The incessant roar, reinforced by a thousand echoes, fills the cañon.[1]

18. *The Snake River Plains.*

These great desert plains extend from the southern extremity of the Bitter Root and Salmon River Ranges southward to the Snake, and from Eastern Idaho nearly to its western boundary. Their surface is slightly undulating, broken only by crevices, and covered by drifting sand, or, in its absence, by bare rock and boulders. *Artemisia* is almost its sole vegetable product, and here this bush attains arborescent proportions, growing to a height of 12 to 15 feet, with trunks nearly a foot in diameter. It has little water upon its surface. The streams from the mountains soon disappear in crevices, to reappear and disappear perhaps again, meantime flowing beneath the basalt floor in subterranean channels.

Near the middle of this desert are three mountains, standing alone and detached from one another, the "Three Buttes." Strange objects are these mountains, rising nearly 3000 feet above the plain. Of their structure we know nothing, as they have never been studied by the geologist. From time immemorial they have served as landmarks to the traveller on these pathless wastes like lighthouses to the mariner.

19. *The Big Horn Mountains.*

The Big Horn River is the largest branch of the Yellowstone, flowing into it from the south-west. Its tributaries from the west drain the Yellowstone and Wind River Ranges, while those from the east drain the Big Horn Mountains. The latter is a broad massive range, in whose eastern slopes head the Powder, Tongue, and other large branches of the Yellowstone. This region has long been the home of the most warlike tribe of Indians, the Sioux. From these rocky fastnesses they have long repelled the invading white man. It is only within a few years that the advancing wave of civilisation has here acquired sufficient power to sweep the red man away, and put the beautiful valleys and the rich mineral deposits of this region into the hands of the whites.

We pass now southward across the broad beautiful valleys of Wind River, a branch of the Big Horn, and the Sweetwater. These valleys have long been a border-land, the scene of many and bloody fights between the two contending races. The old overland road up the valley of the Sweetwater is lined with the graves of victims of Indian atrocities, and the ruins of cabins here and there tell a similar tale.

20. *The Continental Water-parting from South to Bridger's Pass.*

South of the Wind River Range the continental "divide" follows a line of plateaus south-eastward to the Park Range of Southern Wyoming and Colorado. These plateaus decrease in elevation on either hand, on the east grading down into the valley of the North Platte and the Laramie Plains, on the west to the Green River Basin.

The summit of this plateau is broad, and so flat that

for many miles one cannot tell whether he is on the Pacific or Atlantic slope. The height of the water-parting in this section is about 8000 feet above sea-level.

21. *The Southern Section of the Rocky Mountains.*

The southern section of the Rocky Mountains comprised in Southern Wyoming, Colorado, and New Mexico, contains the greatest mass of elevation. Though not containing the highest peaks, being excelled in that respect by the Sierra Nevada and Cascade Range, it contains the greatest number of high peaks. Here are ranges extending for hundreds of miles, whose crests are surmounted by lines of peaks exceeding 14,000 feet in height, and whose mean elevation exceeds 13,000 feet.

While the ranges trend a few degrees (20° to 25°) east of south, the edge of the plains, *i.e.* the foot of the mountains, trends nearly south. The result of this is an *en echelon* arrangement of the ranges, the front one disappearing in the plains, while that which was second in the line comes to the front.

Proceeding westward from the western border of the plains, we cross a succession of two, three, or more well-defined ranges, beyond which are scattered groups of mountains apparently without system. There is a great contrast in this respect between the eastern and western sides of the system. On the east the plains are bordered by well-defined ranges, whose crests are sharply cut; while on the west the mountain-making forces seem to have expended themselves in throwing up groups more or less isolated.

22. *The Colorado or Front Range.*

From the North Platte River, in Southern Wyoming, southward to the debouchure of the Arkansas from the

mountains, one continuous range faces the plains. The northern part, in Wyoming, is known as the Laramie Range. This is comparatively low, reaching a mean height not above 9000 feet. It is crossed at Evan's Pass (Sherman Station, Union Pacific Railroad) at an elevation of 8269 feet. Entering Colorado, it suddenly increases in height to 13,000 feet, while its peaks rise above 14,000 feet. Among them are Long's Peak, 14,271 feet; Gray's, 14,341; and Pike's Peak, the well-known landmark to the pioneers of "'59," 14,147 feet. With the latter the range ends, falling off into the plains in a few miles. In the winter of 1803, Major Pike, with an exploring party, made a valiant effort to reach the summit of this mountain, but was finally obliged to turn his back upon it, sadly remarking that nothing but a bird could reach its snowy summit. But now ladies and children ride on horseback to the top, and the U.S. Signal Bureau has a station there, in which men live the year round.

The higher portion of this range, which is nearly coincident with the part in Colorado, is known as the Colorado or Front Range. It is a granite range, heavy and massive in its orographic forms, and with a broad belt of foothills on its eastern slope.

It is cut through by the South Platte, which, heading in South Park, seeks this exit to the plains. About the cañon of this stream the range is very much broken down by erosive agents, but southward it rises again in the mass of which Pike's Peak forms the centre, only to disappear immediately in the plains.

23. *The Sangre de Cristo Range.*

South of the Arkansas River the front rank is taken by the Sangre de Cristo Range, while a short range, known

as the Wet or Greenhorn Mountains, occupies for a short distance the position of a skirmish line. For a long distance the former is a beautifully-simple range, with a sharply defined crest and a single row of peaks. In latitude 37° 30′ it broadens and culminates in a group of mountains, the Sierra Blanca, whose highest peak, Blanca, overtops everything in Colorado. Its height, from a combination of barometric and trigonometric methods, has been determined to be 14,464 feet. This is the highest peak in the country, excepting Alaska and a few summits in the southern part of the Sierra Nevada. This peak, though difficult and dangerous of access, has been ascended twice by parties of the U.S. Geological Survey in the prosecution of their work.

East of this group are the Spanish Peaks, two sharp volcanic summits rising high above the hills which surround them.

Southward the range continues with a slowly decreasing elevation, until, in the latitude of Santa Fé, New Mexico, it loses its continuity, being represented farther south only by short low ranges and isolated groups, which are scattered over the arid regions of Western Texas as far south as the Rio Grande.

This range is not as high as the Colorado Range by 500 to 1000 feet. It differs from it also in its smaller breadth of foothills on the eastern slope. Its core is of granite, while on the base, and extending some distance up its eastern slope, lie stratified beds of the more recent formations. In the main it is not a rugged range, but is rather distinguished by the beauty and regularity of its sharply-cut lines.

24. *The Parks.*

West of these ranges lie the Parks of Colorado, large high mountain valleys, on the very crest of the Cordilleran

plateau. They are four in number, and are known as the North, Middle, and South Parks, and the San Luis Valley.

The first of these lies partly in Southern Wyoming, the Colorado boundary passing through it near the middle. It has an area of about 700 square miles, at a mean elevation of about 7500 feet. Its surface is quite flat, well grassed, and abounding in large game. On all sides rise high mountains, forming an almost continuous wall around the valley. It is drained by the North Platte River.

North of the North Park, and separated from it by high mountains, are the Plains of Laramie, lying west of the Laramie Range. They are fertile and grass-covered, and afford pasturage to vast herds of cattle, and, in the spring and fall, to countless bands of antelope.

South of North Park, separated from it by detached peaks of volcanic origin, is the depression known as Middle Park. It is a collection of narrow valleys, separated from one another by high ranges, spurs from the walls of the Park. In this depression heads the Grand River, a fork of the Colorado.

The next in this meridional series is the South Park. This is a table-land, very uniform in surface, with the exception of a few minor ridges, and in the southern part numerous volcanic buttes. Its shape is nearly elliptical, its longest axis being nearly north and south. It is about 50 miles long, by 25 in breadth. The area is about 1000 square miles. The prevailing slope is from north-west to south-east. The elevation in the northern part is 9500 to 10,000 feet, while in the south-eastern corner it falls to 8000 feet. Its limits are sharply defined by the surrounding mountains, which rise abruptly on all sides to the highest summits. It is drained by the South Platte and its branches. Its surface is covered with the highly nutritious bunch grass, which makes it an excellent pasture-land.

Crossing the Arkansas River, where it flows in a profound cañon in the hills which border South Park on the south, and rounding the north end of the Sangre de Cristo Range, we enter the great valley of San Luis, a vast plain which stretches southward for 140 miles, with an average width of 35 or 40 miles. Its area is more than 5000 square miles, and its elevation ranges from 8000 feet at its northern end to 7400 feet in northern New Mexico. It surface is as flat as a billiard-table. Variations of level are very slight, and are imperceptible to the eye. The beds of the streams are but slightly depressed below the general level. Most of the soil is sandy, and towards the eastern side the sand is heaped up into dunes, many hundreds of feet in height, against the mountains.

The Rio Grande del Norte heads in the San Juan Mountains on the west side of the valley. From the great snow-fields and the abundant showers of these mountains, the stream grows rapidly, and at its entrance into the valley it is one of the largest streams of the State. From the point of entrance into the valley, its course, which heretofore has been nearly east, gradually turns to south as the river slowly sweeps out into the middle of the valley. It has several large tributaries in the valley, but most of the smaller streams merely reach the foot of the mountains, where they are immediately absorbed by the hot thirsty soil.

As in the case of the plains, the area of arable land in this valley is measured solely by the amount of water available for irrigation. It is estimated that, by carefully husbanding the supply of this liquid, about one-half of the area may be rendered productive.

Its natural products are sage, *par excellence*, interspersed with which is considerable bunch and grama grass, rendering it of some importance as a pasture land.

25. *The Park Range.*

This forms the western wall of the three northernmost of the Parks. In the northern part it is high, its peaks reaching a height of more than 12,000 feet. West of Middle Park it is depressed, barely reaching a height of 11,000 feet, and in this part the Grand River has cut a tremendous gorge, nearly 3000 feet deep, cleaving the range from base to summit. Farther south it rises again, and its peaks attain a first-class height. At the northwest corner of South Park stands Mount Lincoln, named in honour of the martyred President of the Republic, 14,296 feet high; Quandary Peak, 14,269 feet; and many others of nearly equal magnitude. Near the lower end of South Park the range ends abruptly in the Buffalo Peaks, the highest of which is 13,541 feet high. Beyond, the range is represented only by comparatively low hills.

West of North and Middle Parks this range ends the system. Thence westward, a succession of plateaus, one below another, like a gigantic staircase, carries the level of the country down to the Green River.

26. *The Sawatch and Elk Ranges.*

In the latitude of South Park the Park Range is by no means the end of the system. There follows, travelling westward, the valley of the Upper Arkansas, here trending with the ranges nearly south, across which rises in cold solemn majesty the Sawatch Range, the "Sierra Madre" of the early Jesuit padres, a range which, for a hundred miles, is crested with a continuous line of peaks more than 14,000 feet in height. Above its northern end towers the mountain of the Holy Cross, 14,176 feet in altitude, on whose eastern face a cross of snow glitters in the morning sunlight. This cross is formed by the

snow lying in two crevices at right angles to one another on the almost perpendicular face of the mountain. Its long arm is fully 1000 feet in length from top to bottom.

Following the irregular crest of the range southward, we pass in succession Massive Mount, 14,298 feet; Elbert Peak, 14,351 feet; La Plata Mount, 14,311 feet; Mount Harvard, 14,375 feet; Mount Yale, 14,187 feet; Mount Princeton, 14,196 feet; Mount Shavano, 14,239 feet; Mount Ouray, 14,043 feet; besides many more unnamed peaks nearly or quite equalling these in altitude.

The passes in this range are correspondingly high only one, and that near the southern end, being below the limit of timber, which is at 12,000 feet above sea.

West of this range rise branches of the Grand River the Gunnison and Roaring Fork; and among the tributaries to these streams are several ranges, ridges, and detached groups, known collectively as the Elk Mountains These mountains are of volcanic origin. Some of the peaks are of volcanic material, readily distinguished from those of sedimentary material by their light-gray, almost white, colour, while the others are a vivid red, brown or maroon. In sharp contrast with the heavy massive forms of those ranges heretofore considered are the spires and pinnacles of these catastrophic mountains. In the eastern members the peaks reach nearly as great an altitude as in the Sawatch, but toward the west they are much lower, and with their disappearance the system of plateaus and mesas of the region of the Colorado begins.

27. *The San Juan Range.*

From the south end of the Sawatch Range a mass of hills runs south-westward, connecting with an enormous mass of mountains about the heads of the Rio Grande, the Rio San Juan, and many branches of the Gunnison.

They can be defined only as a mass, with a long spur, of magnitude amply sufficient to entitle it to the name of range, running southward, and forming the western wall of the San Luis Valley.

This mass radiates drainage in all directions. To the east flows the Rio Grande; to the south the Animas, Florida, Pinos, and the main San Juan; to the west and north the Dolores, San Miguel, Uncompahgre, and other large tributaries to the Grand River. Within these mountains there is no level country, practically. The largest valley, known as Baker's Park, is but four miles long by half a mile in width. It is unnecessary to go into details regarding the height of this range. Suffice it to say that it contains at least a dozen peaks exceeding 14,000 feet, and between one and two hundred above 13,000 feet.

South of this group, in New Mexico, the level of the plateaus is broken by several ranges of greater or less magnitude. Among them may be mentioned the Zuni Mountains, whose peaks reach 12,000 feet; the Sierra Magdalena, Sierra Mateo, and the Sierra de las Mimbres.

28. *The Continental Divide.*

The water-parting of the continent is borne throughout by this system of mountains, most of the way following the crests of ranges, but in some cases stepping down to the broad flat surfaces of plateaus.

In the British Possessions we find it first following the crest of the western member of the system, and, as we trace it southward, it is seen to step eastward from range to range, until, on entering the territory of Montana, it is found that the eastern range bears it. At the south end of this range a western offset is made to the Bitter Root Range, which it follows south-eastward to its

end. Then it follows the summit-line of a broken plateau-like country, in which are several excellent passes, to the head of the Wind River Range, whose jagged crest separates the Colorado from the Big Horn. This range, ending abruptly, leaves only a broad plateau to divide the waters. The Park Range next takes up the "divide," carrying it to the head of North Park, where it makes a great loop to the eastward to enclose Middle Park in the area of Pacific drainage.

Then it sweeps far to the westward, and follows the high summits of the Sawatch Range to its end; then, pursuing a winding course in the confused mass of the San Juan Mountains, it takes itself again to the plateaus, and follows an ill-defined southerly line to the borders of Mexico. Though it follows, as nearly as can be determined, the summit-line of the great general elevation, it by no means follows that it occupies the crests of the highest ranges in the neighbourhood. The reverse seems to be as frequently the case, that there are, on the right and left, ranges which in altitude may overtop that which separates the streams of the two oceans.

CHAPTER VII.

THE PLATEAU REGION OF THE COLORADO RIVER.

1. *General View.*

THE country drained by the Colorado River is a peculiar region. It is a country of plateaus and cañons, the plateaus mainly arid and sterile, where the few streams flow in deep gorges far below the surface.

The longest and most northern branch of the Colorado is Green River, which heads in the Wind River Mountains, against the sources of the Big Horn and the Snake Rivers. This stream, in its long course towards the south, receives the waters of the Uintah from the west, and the Yampa and White Rivers from the east. Near latitude 38° 15′, and longitude 110°, it is joined by the Grand River, a stream of nearly equal size, which heads in Middle Park, Colorado, drawing its first supplies of water from the snow-fields of Long's Peak. The stream below the junction of these two forks is known as the Colorado.

Below their junction, the principal branches of the Colorado from the east are the San Juan, the Colorado Chiquito or Flax River, William's Fork, and the Gila; on the west, the "Dirty Devil," Paria, and Virgin.

This region is limited on the east, north, and northwest by high mountain ranges. Its surface is nearly flat, but by no means unbroken. There is little rolling or undulating country. Changes of level take place by very

gentle uniform slopes, or by abrupt precipitous steps. A large part of the surface consists of bare rocks, with no soil or vegetation. A part is covered with a thin sandy soil, which supports a growth of sage and *cacti*, or even a few piñon pines and cedars. The only vegetation is that eminently characteristic of an arid country.

This aridity has modified orographic forms to an astonishing degree. Where, under different climatic conditions, there would be produced a region similar in most respects to the prairies of the Mississippi Valley, we find a country, flat indeed, or inclined at low angles, but one whose watercourses are far beneath the general level, deep down in cañons, hundreds, thousands of feet beneath the surface.

Great cliffs, thousands of feet in height, and extending like huge walls for hundreds of miles, change the level of the country at a single step.

Isolated buttes and mesas, of great height, are scattered over the plateaus, indicating the former height of the plain of which they formed parts.

"The landscape everywhere, away from the river, is of rock—cliffs of rock, tables of rock, plateaus of rock, terraces of rock, crags of rock,—ten thousand strangely carved forms. Rocks everywhere, and no vegetation; no soil; no land. . . . When speaking of these rocks, we must not conceive of piles of boulders, or heaps of fragments, but a whole land of naked rock, with giant forms carved on it; cathedral-shaped buttes, towering hundreds or thousands of feet; cliffs that cannot be scaled, and cañon walls that shrink the river into insignificance, with vast hollow domes and tall pinnacles, and shafts set on the verge overhead, and all highly coloured—buff, gray, red, brown, and chocolate; never lichened, never moss-covered, but bare and often polished."

The above description by Major J. W. Powell, who

has explored the cañons of the Colorado, gives a graphic pen-picture of the lower and more arid plateaus of this region.

Nearly every watercourse, whether perennial or not, is a cañon; a narrow valley, with precipitous walls, often of enormous height. In many cases these cañons are so numerous that they cut the plateau into shreds—a mere skeleton of a country. Of such a section, Lieutenat Ives, who explored the course of the Lower Colorado, writes:—"The extent and magnitude of the system of cañons in that direction is astounding. The plateau is cut into shreds by these gigantic chasms, and resembles a vast ruin. Belts of country, miles in width, have been swept away, leaving only isolated mountains standing in the gap; fissures so profound that the eye cannot penetrate their depths are separated by walls whose thickness one can almost span; and slender spires, that seem tottering on their base, shoot up a thousand feet from vaults below."

But few of these cañons contain water throughout the year. Most of them are dry at all times excepting for a few days in the early spring, or for a few minutes or hours at most after a heavy shower. It is a characteristic of western North America, as of all arid countries, that the streams, away from their sources in the mountains, lose water, rather than gain it, in traversing the lower country. The dry atmosphere and the thirsty soil absorb it, and, in very many cases, large streams entirely disappear in this way. This is the case to a great extent in the plateau country, and still more so in the Great Basin, where these are the only outlets to the drainage.

A few words will suffice to sketch the manner in which the climate has acted in producing these strange and unique orographic effects. The great degree of aridity of the atmosphere, and the slight rainfall, coupled with its

sudden explosive character, render plant-life very limited in amount. The soil, having little or no protection against the sudden floods, is washed away as fast, or nearly as fast, as it is formed; or, in other words, transportation nearly or quite keeps pace with disintegration. The rains, coming as they always do in floods, run immediately off the bare rock, or over and through the thin sandy soil, sweeping it with them, and, collecting in the little runs with incredible rapidity, rush down them in great body and with great velocity, sweeping everything before them. The waters are turbid and thick with sediment, coarse and sharp-edged from the rapid cutting of the rocks. It is this detritus which Dame Nature uses as her chisel in carving cañons, cliffs, buttes, and the other quaint and curious forms which one meets in this strange land. A clear stream, whatever may be its velocity, has little erosive power; but put these tools in its possession, give it the quantity of coarse sand and gravel which the Colorado and its tributaries always hold in suspension, and its cutting power is enormous. The difference in climatic conditions between the district under discussion and the plains is one of degree only, but it is sufficient to produce very marked differences in orographic forms. Wherever the climatic conditions are such that soil can be formed and be covered with vegetation, there cañons cannot be produced, other than as gaps for the passage of streams through mountain ranges; but, in proportion as the climate becomes more arid, so will the country approach, in its physical features, a cañon land.

While every stream in this region flows in a cañon—and there are thousands of cañons which contain no water whatever—the most remarkable succession of these clefts is that on the main stream of the region, the Colorado, and its main branch the Green. The lower cañons of the

river were explored in 1857 by Lieutenant Ives as far as the head of the Black Cañon. In 1869, Major J. W. Powell explored the main portion of the river in boats. He started from Green River City, in South-western Wyoming, and safely threaded the devious path of the cañons as far as the mouth of the Grand Wash, a distance of 1000 miles. Throughout this distance there are but few miles where the river is not deep in the bowels of the earth.

2. *The Cañons of the Colorado and Green.*

The Green River, on leaving the Wind River Mountains, traverses southward a great plain or valley, known as the Green River Basin, at present an *artemisia* waste, but capable of being reclaimed, in large part, by irrigation. At the foot of this valley it meets the Uintah range, trending at right angles to its course. This range it traverses by a devious course, cutting gorges of enormous depth.

On emerging from these cañons, it enters another valley, quite similar to that above, but smaller, and known as the Uintah Basin. Traversing this, it gradually enters a cañon in sedimentary rocks. These beds, and the surface of the country with them, incline at a very low angle to the north, so that the stream in its southern progress is constantly getting deeper below the surface, until, in a distance of 97 miles, the walls have risen to a height of 3300 feet above the river. At this point the walls break off abruptly, in a direction transverse to that of the river, leaving a small valley at the foot of the cliff.

Lower down there follow two similar cañons, but less in height and length. These inclined plateaus, sloping to the north and breaking off abruptly on the south, extend east and west to the bases of the ranges which border this region, *i.e.* across the plateau country. Of

these Major Powell writes—"Conceive of three geographic terraces, many hundred feet high, and many miles in width, forming a great stairway, from the *Toompin Wunear Tuweap* (*the land of standing rocks*) below, to the Uintah Valley above. The lower step of this stairway, the Orange Cliffs, is more than 1200 feet high, and the step itself is two or three score miles in width. The second step, the Book Cliffs, is 2000 feet high, or more, and a score of miles in width. The third or upper step is more than 2000 feet high. Passing along this step for two or three score miles, we reach the valley of the Uintah; but this valley is not 5000 or 6000 feet higher than the Toompin Wunear Tuweap, for the stairway is tipped backward."

At the foot of the third cañon, another, Stillwater Cañon, immediately commences, and extends below the junction of the Grand and Green. The meeting of the waters takes place in the gloomy depths of this abyss, 1300 feet below the upper surface.

A short distance above their junction, the surface of the country begins to rise with a long gentle slope towards the summit of a fold. Stillwater and Cataract Cañons are cut in this fold. The walls grow gradually higher, but before the river reaches the axis of the fold it seems to become discouraged at the prospect of the difficulties ahead, and turning nearly at right angles, it runs, diagonally to the axis, and as gradually, out of the fold, at the mouth of the Dirty Devil River. There is here a bit of open valley, and then another, Glen Cañon, succeeds. Its greatest height is at its foot, at the mouth of the Paria, where it is 1600 feet.

Again the river runs into cañons, as if afraid of the sunlight. There is here another inclined plateau, sloping toward the north, and in it the river burrows deeper and deeper, until, at the mouth of the Colorado Chiquito, it is

3800 feet below the surface. This is Marble Cañon. The river has turned toward the west, and at the foot of this cañon or—for this is continuous with the Grand Cañon—at the foot of this portion, the general course of the river is west. At this point it is crossed by the Paria fold, in which the throw is to the west, thus suddenly increasing the depth of the cañon by adding to the elevation of the country.

Farther down the river is met another fault, which in some places becomes a fold, running across the river's course. It is an enormous one, with a throw of about 3000 feet, which, like the last, is to the west. This is the eastern Kaibab fault, and the plateau produced by it, the Kaibab (mountain-lying-down) plateau. The cañon here attains its maximum depth, which is nearly 7000 feet. This is not in a single slope from the water; a part of it is in one or two benches, which stand back one, two, or three miles from the edge of the lower cliffs. The throw of the Paria fold has brought to the surface the underlying granite, and the lower cliffs of the Grand Cañon are of this rock.

In Major Powell's story of his trip through these cañons, we find the following fine description of the Grand Cañon:—"The walls now are more than a mile in height, a vertical distance difficult to appreciate. . . . A thousand feet of this is up through granite crags, then steep slopes and perpendicular cliffs rise, one above another, to the summit. The gorge is black and narrow below, red and gray and flaring above, with crags and angular projections on the walls, which, cut in many places by side cañons, seem to be a vast wilderness of rocks. Down in these grand gloomy depths we glide, ever listening, for the mad waters keep up their roar; ever watching, ever peering ahead, for the narrow cañon is winding, and the river is closed in, so that we can see

but a few hundred yards, and what there may be below we know not; but we listen for falls, and watch for rocks, or stop now and then, in the bay of a recess, to admire the gigantic scenery. And ever as we go there is some new pinnacle or tower, some crag or peak, some distant view of the upper plateau, some strange-shaped rock, or some deep narrow side cañon. Then we come to another broken fall, which appears more difficult than the one we ran this morning.

"Clouds are playing in the cañon to-day. Sometimes they roll down in great masses, filling the gorge with gloom; sometimes they hang above, from wall to wall, and cover the cañon with a roof of impending storm; and we can peer long distances up and down this cañon corridor, with its cloud-roof overhead, its walls of black granite, and its river bright with the sheen of broken waters. Then a gust of wind sweeps down a side gulch, and, making a rift in the clouds, reveals the blue heavens, and a stream of sunlight pours in. Then the clouds drift away into distance, and hang around crags and peaks, and pinnacles and towers and walls, and cover them with a mantle that lifts from time to time and sets them all in sharp relief. Then baby clouds creep out of side cañons, glide around points, and creep back again into more distant gorges. Then, clouds set in strata across the cañon, with intervening vista-views to cliffs and rocks beyond. The clouds are children of the heavens, and when they play among the rocks they lift them to the region above. . . .

"The varying depths of this cañon, due to the varying altitudes of the plateaus through which it runs, can only be seen from above. As we wind about in the gloomy depths below, the difference between 4000 and 6000 feet is not discerned, but the characteristics of the cañon —the scenic features—change abruptly with the change

in the altitude of the walls as the falls are passed. In running the channel which divides the twin plateaus, we pass round the first great southern bend. In the very depths of the cañon we have black granite, with a narrow cleft through which a great river plunges. This granite portion of the walls is carved with deep gulches, and embossed with pinnacles and towers. Above are broken, ragged, nonconformable rocks, in many places sloping back at a low angle. Clambering over these, we reach rocks lying in horizontal beds. Some are soft; many very hard; the softer strata are washed out; the harder remain as shelves. Everywhere there are side gulches and cañons, so that these gulches are set about ten thousand dark gloomy alcoves. One might imagine that this was intended for the library of the gods; and it was. The shelves are not for books, but form the stony leaves of one great book. He who would read the language of the universe may dig out letters here and there, and with them spell the words, and read, in a slow and imperfect way, but still so as to understand a little, the story of creation."—*Exploration of the Colorado River of the West:* Washington, 1875, pp. 83, 85, 193-4.

3. *Running a Rapid.*

The dangers of the navigation in rivers, like the Colorado, winding through a series of cañons are naturally often of a very formidable character. The writer just quoted, who ran many risks in his exploration of these regions, had on one occasion to navigate a rapid in the Grand Cañon at the imminent peril of his life. "About eleven o'clock," he writes, "we hear a great roar ahead, and approach it very cautiously. The sound grows louder and louder as we run, and at last we find ourselves above a long, broken fall, with ledges and pinnacles of

rock obstructing the river. There is a descent of perhaps 75 or 80 feet in a third of a mile, and the rushing waters break into great waves on the rocks, and lash themselves into a mad white foam. We can land just above, but there is no foothold on either side by which we can make a portage. It is nearly 1000 feet to the top of the granite, so it will be impossible to carry our boats around, though we can climb to the summit up a side gulch, and, passing along a mile or two, can descend to the river. This we find on examination, but such a portage would be impracticable for us, and we must run the rapid or abandon the river. There is no hesitation. We step into our boats, push off, and away we go; first on smooth but swift water, then we strike a glassy wave and ride to its top, down again into the trough, up again on a higher wave, and down and up on waves higher and still higher, until we strike one just as it curls back, and a breaker rolls over our little boat. Still, on we speed; shooting past projecting rocks, till the little boat is caught in a whirlpool, and spun round several times. At last we pull out again into the stream, and now the other boats have passed us. The open compartment of the 'Emma Dean' is filled with water, and every breaker rolls over us. Hurled back from a rock —now on this side, now on that—we are carried into an eddy, in which we struggle for a few minutes, and are then out again, the breakers still rolling over us. Our boat is unmanageable, but she cannot sink, and we drift down another hundred yards through breakers—how, we scarcely know. We find the other boats have turned into an eddy at the foot of the fall, and are waiting to catch us as we come, for the men have seen that our boat is swamped. They push out as we come near, and pull us in against the wall. We bail our boat, and on we go again" (*op. cit.* pp. 82-3).

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The walls of the Grand Cañon and the level of the plateau descend by a succession of great steps, produced by faults, until the level of the river is reached at the mouth of the Grand Wash; and thus ends the Grand Cañon.

Below the Grand Wash, a dry stream bed which enters the Colorado from the north, the river turns south again and enters the Black Cañon of Lieutenant Ives' report—a cañon which would be a remarkable feature were it not brought into such close juxtaposition with that described above.

Below it the river runs in narrow valleys and low cañons to its mouth.

4. *Fauna and Flora of the Plateau Region.*

This region is not all a desert. The high plateaus must be excepted from the general condemnation, but as these are in the immediate vicinity of the mountains, and are of very limited extent, they can scarcely be considered as belonging to the plateau region. On these the fauna and flora of the mountain region are found in abundance, dependent in large measure upon the elevation. As we go down into the true cañon country, the scene changes. Aspens give place to piñon pine and cedar; the grasses, fruits, and flowers, to sage, *cacti*, and bare rock; the streams become confined in rocky cañons, turn muddy and warm, and gradually disappear. The game changes, —deer and elk are replaced by the coyote, while rattlesnakes and centipedes assert their proprietorship. Of the fauna Major Powell writes—"Among the buttes on the lower terraces, rattlesnakes crawl, lizards glide over the rocks, tarantulas stagger about, and red ants build their playhouse mountains. Sometimes rabbits are seen, and wolves prowl in their quest; but the desert has no bird of sweet song and no beast of noble mien."

CHAPTER VIII.

THE GREAT BASIN.

1. *Its General Appearance.*

BETWEEN the Wahsatch Range and the Sierra Nevada lies a great area, which has no outlet to either ocean—an area containing many great ranges of mountains, with broad valleys at their bases; but the mountains send down to the plains few permanent streams, and nearly all of these are absorbed by the thirsty soil immediately, or flow into salt lakes, to feed the increasing thirst of the dry atmosphere.

On the east this region is tolerably well defined by the Wahsatch and other ranges, on the west by the Sierra Nevada. On the north and south, however, its limits are not sharply defined, the water-partings being, in most cases, mere swells in otherwise flat valleys.

2. *The Wahsatch Range.*

On the west side of the basin, separating it in part from the plateau region, is a high and important range, known as the Wahsatch Range. Its extreme summits reach nearly to 13,000 feet, but in the greater part of the range they are from 10,000 to 11,000 feet in height.

The range is traversed by several streams which, heading in its eastern foothills, flow westward, cutting

terrific gorges through its centre. Of such are the Provo (formerly known as the Timpanogos), the Weber, Ogden, and several branches of the Bear, a tributary to the Great Salt Lake.

3. *The Basin Ranges.*

The Basin is traversed by a large number of ranges of mountains, trending nearly parallel to a meridian, but varying slightly from that course to the north-east in the eastern part of the region, and to the north-west in the western part. These ranges are distributed over this area with tolerable regularity. They are mainly simple in structure; some are short, others extend over several degrees of latitude, and are of heights ranging from 5000 to 10,000 feet above sea-level.

Between them are valleys of considerable breadth, floored by the detritus from the mountains, which buries deeply their bases, leaving to the imagination alone to picture the full magnitude of these ranges, of which the summits only appear above the surface.

These ranges are composed of sedimentary rocks, unaltered or metamorphosed; granite and cognate rocks, and volcanic rocks.

Most of these valleys are utter deserts. There is absolutely no water in them from one end of the year to the other. In the spring tiny rills may run down from the little snow in the mountains, but they sink immediately on reaching the plain, and for nearly all the year these even are dry. The only source of supply to the traveller over these arid wastes is from the springs which are found occasionally at the bases of the mountains.

A few of the valleys are watered in part by small streams which flow through them, and, in such cases, the soil is found to be of marvellous fertility.

The Humboldt River, which takes its rise in the Humboldt Range and flows south-westward, to disappear in the Humboldt Sink, waters a narrow belt in each valley which it crosses.

The Sevier River, too, though a small stream, waters a long narrow belt along its sinuous course, and deposits its remaining waters in Sevier Lake.

The following general description of the features of the Great Basin is found in the *Report of the U.S. Geological Survey for* 1870 :—

"Let us for a moment take a bird's-eye view of the great inland basin of which Salt Lake Valley forms only a part. We shall find that what is termed the Great Basin of the West comprises the vast area enclosed by the Wahsatch Mountains on the east and the Sierra Nevada on the west; the crest or water-divide of the Columbia on the north, and that of the Colorado on the south. We shall also observe that this great region has no visible outlet; that it is composed of a multitude of smaller basins or valleys, each of which has its little lakes, springs, and watercourses, their surplus water either evaporating or sinking beneath the surface. If we examine the elevations in this region, we observe a wonderful uniformity in the surface of the valleys, and find that none of them are much above the level of the waters of Great Salt Lake. . . . I infer that a fresh-water lake once occupied all this immense basin; that the smaller ranges of mountains were scattered over it as isolated islands, their summits projecting above the surface; that the waters have gradually and slowly passed away by evaporation, and the terraces are left to reveal certain oscillations of level and the steps of progress towards the present order of things; and that the briny waters have concentrated in those lake-basins which have no outlet."

THE GREAT SALT LAKE, UTAH.

The Great Basin is a collection of smaller basins; each, in cases where it has any drainage whatever, with its own stream or streams; its sink, which, in cases where sufficient water is brought in, develops into lakes, marshy swamps, and the like. Those lakes which have no outlet are salt; those which communicate with others lower down are of course fresh.

The lakes of the Basin are mainly disposed in three groups, one on the east and west sides of the Basin respectively, under the shadow of the limiting ranges, and one in the northern part.

4. *Great Salt Lake.*

The principal member of the eastern group is the Great Salt Lake, which receives most of the drainage from the Wahsatch Mountains. It is almost an inland sea, having an area at present of 2360 square miles. It is very

shallow, having a mean depth of but four or five fathoms, while in its deepest part it reaches but eight fathoms.

As it has no outlet, its waters would rapidly rise were it not for the enormous evaporation in this dry region. The level of its waters is constantly subject to change with the character of the seasons, whether wet or dry; and it is therefore a very sensitive indicator of changes in the climate, particularly as the country around it is extremely level, and but very slightly above the present surface of the lake. Since 1849-50 the surface of the lake has risen 11 feet, and its present area is 40 per cent greater than at that time, indicating a decided increase in moisture of the climate. Whether this is due to the settlement of the country is an open question.

The water of the lake is very strongly saline. The human body floats almost entirely on the surface. At the time of Captain Stansbury's survey in 1850, the water contained 22·4 per cent of solid matter. At present the percentage of solid matter is much less. In 1869 it was reduced to 14·8. An analysis of the solid matter by the survey of the 40th parallel (*vide Rept. Sur. 40th Par.*, vol. ii. p. 433) gave in 150 parts

Magnesia	6·301
Lime	0·357
Soda	66·978
Potassa	2·901
Sulphuric acid	8·215
Chlorine	83·946
	168·698
Less oxygen of soda and magnesia .	18·758
	149·940

or, in other words—

Chloride of sodium . . .	79·11
Chloride of magnesium . . .	9·95
Sulphate of soda . . .	6·22
Sulphate of potassa . . .	3·58
Sulphate of lime . . .	0·57
Excess of chlorine . . .	0·57
	100·00

The elevation of the lake above sea-level is 4218 feet.

Great Salt Lake is but the ruin of a much grander lake, which, in ages past, covered a large part of the area of the Great Basin. The shore-line of this great lake, for which the name of Bonneville has been proposed, is yet distinctly marked high up on the slopes of the Wahsatch and other ranges in this part of the Basin, 970 feet above its present surface. At that time it had an outlet, draining northward into the Snake or Lewis Fork of the Columbia. During the process of desiccation of the country, caused by the rise of the Sierra Nevada, the lake receded, but its recession was checked for greater or less intervals, which are indicated by minor beach-lines, which form a succession of steps upon the mountain side.

5. *Death Valley.*

There are within the Great Basin two valleys which are remarkable as lying below the level of the sea. One of these, in Eastern California, is known as Death Valley, from the number of persons who have miserably perished there from thirst. Parts of this valley are 150 feet below the sea-level.

It is a desert valley, lying between two of the characteristic ranges of the Basin, known as the Amargoza and the Panamint Ranges, which rise 7000 feet above its

level. There is no water in the whole extent of this valley,—nothing but bare rock and shifting sand, if we except a few cacti and a little stunted sage. In the summer, the sun's rays, pouring down on the bare rocks, make the heat intolerably intense, and increase the pangs of thirst to the unfortunate traveller. Few persons have succeeded in crossing this terrible place, though many have attempted it.

The second locality is in South-western California, and is known as Soda Lake. The lowest parts of this valley range from 100 to 200 feet below the sea. A very low water-parting separates it from the Gulf of California and the Colorado River; and at times of high water in this river it overflows the water-parting and forms a shallow lake here, which, however, disappears by evaporation during the hot summer months.

THE CASCADE MOUNTAINS.

CHAPTER IX.

THE PACIFIC RANGES.

1. *In General.*

FROM Alaska to the point of the peninsula of Southern California stretches almost continuously a great system of mountains, parallel to the Pacific coast. Parts of it are known respectively as the Cascade Range, the Sierra Nevada, the Coast Ranges, etc. The range divides in Washington Territory, a minor branch extending southward along the coast through Oregon and California, while the principal range trends parallel to it and the coast, but farther to the eastward. Between them is a succession of broad valleys—those of the Willamette in Oregon, and of the Sacramento and San Joaquin in California, being the principal ones.

2. *The Cascade Range.*

The northern part of the eastern and principal range, from Mount Shasta in Northern California northwards through Oregon, Washington Territory, the British Possessions, and Alaska, is geologically quite distinct from the southern portion, and differs markedly from it in its

topographical features. This part of the system is known as the Cascade Range, a name derived from the cascades of the Columbia River, where it cuts a passage, by a narrow gorge, through these mountains. Its character in Oregon, Washington Territory, and British Columbia, is that of a broad low range, surmounted by many high volcanic peaks. A few of these peaks, especially in the far north, are still active volcanoes. Mount St. Helens, Washington Territory, is reported, upon good authority, to have erupted in February 1842, sending down streams of lava over its sides. Mount Baker, Washington Territory, is said to be still smoking; Mount Rainier, in the same territory, still gives off steam; while in Mount Shasta, California, the only sign of volcanic activity is a small hot spring near the summit.

Many of these peaks reach very considerable elevations. The highest is unquestionably Mount St. Elias, in Alaska, whose height is about 14,970 feet.

3. *Results of the latest Surveys.*

The most prominent crests of the Cascade Range in Oregon and Washington Territory have of late years been repeatedly scaled, yet considerable discrepancies still exist respecting their elevations. Hence it becomes no easy matter to decide the question of pre-eminence amongst these peaks. It was long awarded to Mount Hood, on August 20th, 1866, ascended by Alphonso Wood and the Rev. Mr. Atkinson, and by them found to be 17,430 feet high. The limits of timber were fixed by these observers at 8970, and those of vegetation at 10,900 feet. But on August 23d, 1867, the same mountain was scaled, under very favourable atmospheric conditions, by the United States engineer officer, Lieutenant-Colonel Williamson, who conducted

his observations with very reliable instruments, and found its height to be only 11,225 feet. With this agrees tolerably well the trigonometrical survey carried out by Professor Whitney in Oregon during the summer of 1867, a rough calculation showing about 11,700 feet for Mount Hood, and about 1000 feet less for Mounts St. Helens and Adams.

Similar discrepancies exist respecting Mount Baker, whose height has been variously given at 10,760, 10,650, and 10,500 feet,—this last by Coleman, who scaled it on August 17th, 1868, and who found the neighbouring Sherman Peak to be about the same height. He believed the snow-line might here be fixed at 5100 feet, which is unquestionably too low. The summit, a steep icy cone, which could be reached only by hewing steps in the ice, presents a flat surface 1300 feet in diameter, its snowy mantle unruffled by a single rocky protuberance.

At the foot of Sherman Peak, distant some 1500 feet from Mount Baker, lies the crater, 900 feet broad, its blackened walls here and there coloured by sulphur. Through a fissure in the side of this crater prodigious masses of lava have been poured forth, the sulphurous odour, combined with the smoke and absence of snow, clearly showing that the fires still slumber in the bosom of the mountain.

4. *Mount Rainier—Glaciers.*

On the other hand, the height of Mount Rainier or Tachoma has been definitely settled by Professor Davidson at 14,444 feet. Hence it is four feet higher than Mount Shasta, and consequently the most elevated point in the Cascade Range of the States. It has a glacier ten miles in length by five broad, many others of a like character being elsewhere found in this range. That glaciers really exist in the giant mountains of the Pacific States

had already been ascertained by the late Lieutenant A. von Kantz some twenty years ago, when, on attempting to scale Mount Rainier, he found his way barred by large glaciers. Stephens and Van Trump, who ascended the same mountain in the summer of 1870, as well as Professor Davidson, have all determined the presence of extensive glaciers on its slopes.

5. *Mount Shasta.*

The land east of the Scott Mountains, consequently in the direction of the northern spurs of the Sierra Nevada, comprises a broad volcanic plain, here and there broken by considerable mountain chains. Above the main plain itself, at an elevation of 14,440 feet above the sea, towers Mount Shasta, the solitary cone of an enormous extinct volcano, lying almost exactly in the line of the axis of the Sierra Nevada. At its foot are grouped hundreds of little volcanic hills, which, however, pass almost unnoticed beneath the shadow of the great peak. The volcanic plain is partly wooded and partly overgrown with grass and wild sage. But in whatever direction we go, the one central point in the landscape is the great cone of Mount Shasta. Its solid snow-capped peak, its stupendous elevation, the pale gray or rosy tints of its lava fields, and the dark wooded belt encircling it far above the numerous satellites at its base, impart to this imposing mountain a grandeur scarcely equalled by any other elevation in the New World.

Mount Shasta was scaled in the year 1870 by the American geologist Clarence King, accompanied by S. F. Emmons, Fred. A. Clark, A. B. Clark, and Sisson, a ranchman living at the base of the mountain. King describes the ascent as follows :—[1]

[1] Quoted from the *Atlantic Monthly* of December 1871, pp. 710-720.

"September 11th found the climbers of our party mounted on our mules heading for the crater-cone over rough rocks, and among the stunted firs and pines which mark the upper limit of forest growth. The morning was cool and clear, with a fresh north wind sweeping around the volcano, and bringing in its descent the invigorating cold of the snow region. When we had gone as far as our mules could carry us, threading their difficult way among piles of lava, we dismounted and made up our packs of beds, instruments, food, and fuel

MOUNT SHASTA.

for a three days' trip . . . and with Sisson, who was to accompany us up the first ascent, struck out on foot. Already above vegetation, we looked out over all the valley south and west, observing its arabesque of forest, meadow, and chaparral, the files of pines which struggled up almost to our feet, and just below us the volcanic slope, strewn with red and brown wreck, and patches of shrunken snow-drift.

"Our climb up the steep western crater-slope was slow and tiresome, quite without risk or excitement.

The footing, altogether of lodged debris, at times gave way provokingly, and threw us out of balance. Once upon the spiry pinnacles which crown the crater-rim, a scene of wild power broke upon us. The round crater-bowl, about a mile in diameter and nearly a thousand feet deep, lay beneath us, its steep shelving sides of shattered lava mantled in places to the very bottom by fields of snow.

"We clambered along the edge toward Shasta, and came to a place where for a thousand feet it was a mere blade of ice, sharpened by the snow into a thin frail edge, upon which we walked in cautious balance, a mis-step likely to hurl us down into the chaos of lava blocks within the crater.

"Passing this, we reached the north edge of the rim, and from a rugged mound of shattered rock looked down into a gorge between us and the main Shasta. There, winding its huge body along, lay a glacier, riven with sharp deep crevasses, yawning 50 to 60 feet wide, the blue hollows of their shattered depth contrasting with their brilliant surfaces of ice. . . .

"Later we met for bivouac, spread our beds upon small debris under the lee of a mass of rock on the rim, and built a little camp-fire, around which we sat closely. . . .

"We turned in. Upon cold stone our bed was anything but comfortable, angular fragments of trachyte finding their way with great directness among our ribs and under our shoulder-blades, keeping us almost awake in that despairing semi-consciousness when dreams and thoughts tangle in tiresome confusion. . . .

"The next day was brilliant and cloudless, the cold still air full of life and inspiration. Through its clear blue the Shasta peak seemed illusively near, and we hurried down to the saddle which connects our cone with

the peak, and across the head of a small tributary glacier, and up over the first debris slopes. It was a slow tedious three hours' climb over stones which lay as steeply as loose material possibly can, up to the base of a red trachyte spur; then on up a gorge, and out upon a level mountain shoulder, where were considerable flats covered with deep ice. . . .

"The farther ascent lies up a long scoria ridge of loose red pumaceous rock for seven or eight hundred feet, then across another level step covered with rugged ice, and up into a sort of corridor between two steep, much broken, and stained ridges. Here in the hollow are boiling sulphurous springs and hot earth. . . .

"A short rapid climb brought us to the top; four hours and thirty minutes from our crater bivouac.

"There is no reason why any one of sound wind and limb should not, after a little mountaineering practice, be able to make the Shasta climb. There is nowhere the shadow of danger, and never a real piece of mountain climbing,—climbing, I mean, with hands and feet; no scaling of walls, or labour involving other qualities than simple muscular endurance." . . .

6. *The Sierra Nevada.*

The Sierra Nevada extends along the eastern border of the State of California, from Tejon Pass northward to Lassen's Peak, a distance of about 450 miles. South of Tejon Pass the range decreases in height, joins the Coast Range, and becomes topographically identified with it. North of Lassen's Peak the metamorphic rocks which make up the Sierra disappear beneath a volcanic plateau which stretches northward to Mount Shasta, forming the link connecting the Sierra with the volcanic Cascade Range. The average breadth of the Sierra Nevada is

about 80 miles, of which by far the greater part is taken up with the western slope. The western foot of the range is but little above sea-level, while its eastern base is 4000 to 5000 feet above tide-water.

The highest and most rugged portion of this range is about latitude 36° 30′, where the peaks range in height from 14,000 to 15,000 feet. South of this, it falls abruptly to Tejon Pass, while northward its elevation decreases gradually but uniformly to its northern end.

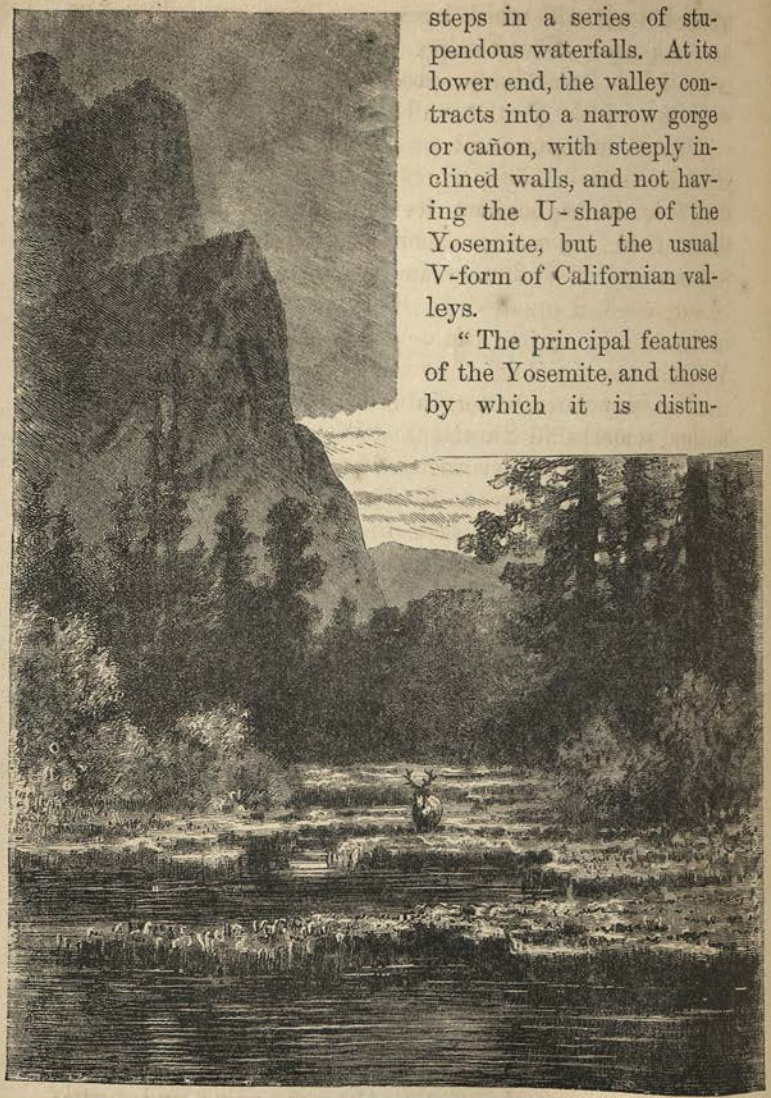
7. *The Yosemite Valley.*

We cannot do better, in order to give a general idea of this remarkable natural feature, than quote the description of this valley written by Professor J. D. Whitney, in the *Guide Book to the Yosemite*, p. 84 *et seq.*

"The Yosemite Valley is nearly in the centre of the State (California) north and south, and just midway between the east and west bases of the Sierra, here a little over 70 miles wide. . . . The valley is a nearly level area about 6 miles in length, and from half a mile to a mile in width, and sunken almost a mile in perpendicular depth below the general level of the adjacent region. It may be roughly likened to a gigantic trough hollowed in the mountains, nearly at right angles to their regular trend. . . . This trough . . . is quite irregular, having several re-entering angles and square recesses, let back, as it were, into its sides; still a general north-east by easterly direction is maintained in the depression, until we arrive near its upper end, where it turns sharply, at right angles almost, and soon divides into three branches, through either of which we may, going up a series of gigantic steps, as it were, ascend to the general level of the Sierra. Down each of these branches, or cañons, descend streams, forks of the Merced, coming down the

steps in a series of stupendous waterfalls. At its lower end, the valley contracts into a narrow gorge or cañon, with steeply inclined walls, and not having the U-shape of the Yosemite, but the usual V-form of Californian valleys.

"The principal features of the Yosemite, and those by which it is distin-



YOSEMITE VALLEY, CALIFORNIA.

guished from all other known valleys, are—first, the near approach to verticality of its walls; second, their great height, not only absolutely, but as compared with the width of the valley itself; and finally, the very small amount of talus or debris at the base of these gigantic cliffs. These are the great characteristics of the Yosemite throughout its whole length, but, besides these, there are many other striking peculiarities, and features both of sublimity and beauty, which can hardly be surpassed, if equalled, by those of any mountain valley in the world. Either the domes or the waterfalls of the Yosemite, or any single one of them even, would be sufficient in any European country to attract travellers from far and wide in all directions. Waterfalls in the vicinity of the Yosemite, surpassing in beauty many of those best known and most visited in Europe, are actually left entirely unnoticed by travellers because there are so many other objects of interest."

The objects of interest in this valley, which render it without a rival in scenic effects in the known world, are—1st, the great cliffs and crags which border it, rising 3000 to 4000 feet in vertical height above its level; 2d, the wonderful bas-relief of columns, spires, and arches upon its granite walls; and 3d, the grand and beautiful waterfalls by which the many tributaries to the Merced enter the valley, leaping over its walls from great heights. These deserve a more particular mention. Chief among them is the Yosemite Fall. This has a total height of 2600 feet, the upper 1500 feet of which is in a clear leap from the top of the cliff. Then follows a succession of cascades of 600 or 700 feet, below which the stream makes a second fall to the bottom of the valley. The Bridal Veil Fall, though carrying much less water, is very beautiful. In its leap of 630 feet, the column of water is swayed hither and thither by the wind, and nearly

dissolved into spray, which makes its fanciful name by no means inappropriate. Other notable falls are the Vernal, 400 feet, and the Nevada Fall, 600 feet in height.

8. *The Coast Ranges.*

This sub-system extends along the coast, in most places closely hugging it, and nowhere far from it. It commences in Washington Territory, and, with many breaks, it runs to the southern end of the peninsula of California. It is made up of a great number of short ranges, in many cases but slightly connected with one another except by juxtaposition. In Washington Territory these ranges are not clearly defined, topographically, from the Cascade Range. In Oregon, however, the great valley of the Willamette separates them; but in the southern part of this State and in Northern California they again become confused, large heavy spurs from the Cascades connecting them. Again they separate, this time having the broad fertile valley of the Sacramento and San Joaquin between them; and when they again come together, it is with what is left of the main range of the Sierra Nevada that the Coast system joins in the southern part of California.

In point of elevation the parts of this system vary widely. From 3000 to 4000 feet above the sea in mean height in North-western Oregon, it rises southward, until in the southern part of this State, and in California nearly as far as the Bay of San Francisco, it has a mean height not less than 6000 feet. The Bay of San Francisco lies in a great gap, just in the trend of this system. South of it the ranges have much less height, reaching only 2000 to 3000 feet above the sea. One of the most prominent peaks is Monte Diable, rising right up from the bay to a height of 3860 feet, and commanding a most beautiful view of one of the finest harbours in the world,

which lies spread out at its base; while to the west, away across the yellow plain of the Sacramento Valley, is revealed the splendid panorama of the snowy crests of the Sierra Nevada.

Among these ranges are many of the most fertile valleys of this most fertile State.

At the junction of the Sierra Nevada and Coast Ranges there is another decided rise in elevation, while, tracing the system southward, it is seen to decrease again, and become more and more broken, while a single range continues the system in arid rocky hills down the peninsula of Lower California.

9. *The Sacramento and San Joaquin Valley.*

This great valley, the granary of California, lies between the Sierra Nevada and the Coast Ranges. It is a great flat expanse, watered by numerous streams from the former range. It has, in common with all the Pacific coast region, a peculiar climate, depending upon its topographic relations, an alternation of wet and dry seasons. The former is the winter, the latter the summer season. While in British Columbia and Western Washington Territory it rains or snows almost constantly in the winter season, so that the inhabitants are known as "Webfeet," the rainfall diminishes markedly on proceeding southwards. Still, in the Willamette Valley, in Oregon, it is sufficiently great to enable farming to be carried on without irrigation; indeed, this is the case in the northern part of California. But throughout the greater part of this great valley of California, while the annual rainfall would be sufficient to support most crops, it is so unevenly distributed that, practically, irrigation is found necessary. If one rides over the San Joaquin Valley in February, he finds everything green and flourishing; the country

resembles the prairies of the Mississippi States in the late spring. Pass over the same ground in July or August, and mark the change. The ground is bare; the grass, which before was so green and flourishing, is dry and burned to powder by the sun's ardent rays. The very earth is cracked, as though by an earthquake. The cattle, which before were browsing in the luxuriant herbage, have been driven to the foothills, to avoid starvation, and the numerous bovine skeletons by the wayside show how imminent was the danger.

10. *The Vegetation of the Sierra.*

Leaving the beauties of the Golden Gate and the picturesque chasms of the Coast Ranges, and turning our faces eastward, we cross at first the broad, yellow, naked plains of the Sacramento, baking in the intense heat of a midsummer sun. The harvests are all gathered, and the stacks of grain in the fields everywhere, and the loaded grain-cars at every station, attest the abundance of the harvest. Here and there the monotony of the plain is broken by a patch of the evergreen oak, but it is not until we reach the slopes of the Sierra that true tree vegetation is met with.

On the foothills of the range are found in scattered groups the digger pine (*P. sabiniana*) and the black oak (*Q. sonomenis*). The pale-bluish tint of the pine contrasts finely with the dark green of the oak, and both stand out in fine relief against the yellow background of the soil. Farther up the mountain-side we reach a moister region, where trees grow more densely, and are more finely developed. Here abound the pitch pine (*P. ponderosa*), the sugar pine (*P. Lambertiana*), the white cedar (*Libocedrus decurrens*), and the Douglas spruce (*Abies Douglassi*). This is the true forest belt of the Sierra, and it is in this belt that the "Big Trees" are found.

Next in our ascent we reach the region of the firs, and the tamarack pine, at 7000 to 9000 feet above the sea, in the middle of the State; and above this belt we find yet another, characterised by the *Pinus flexilis*, struggling with the winds and frosts for an existence on these mountain heights.

GIANT TREES.

11. *The "Big Trees."*

The groves of the Big Trees (*Sequoia gigantea*) are limited in geographical range, both horizontally and vertically. There are eight distinct groves known to exist, and they are all between latitude 36° 00′ and 38° 15′, and between 5000 and 7000 feet in elevation.

The Calaveras Grove is the one most visited and best known. It is on the western slope of the Sierra, in Calaveras County. It occupies an area 3200 feet long by 700 feet broad. There

are between ninety and one hundred trees of large size in the grove, besides many smaller ones. One of the largest and finest has been cut down by vandals; its greatest rival has had the bark peeled from it so as to destroy it.

Thirty-one of the trees in this grove have been measured. The highest is 15 feet in diameter at 6 feet from the ground, and 325 feet in height. Others, though not as high, exceed this in diameter; the "Mother of the Forest" being, without the bark, 20 feet through. The smallest of the thirty-one trees measured is 10 feet in diameter and 231 feet in height.

12. *Agricultural Resources of the Cordilleran Region.*

Throughout this vast region, extending over 20° of longitude, the rainfall is so slight, and the aridity and consequent evaporation so great, that agriculture cannot be carried on, except in a few isolated spots, without artificial irrigation. It is almost as much a matter of course with the farmers of this sparsely settled region as the sowing of the seed. The soil of the plains, plateaus, and mountain valleys of this great region is almost everywhere extremely fertile, and the one thing needed to transform a seeming Sahara into a land of plenty is water.

The supply of water for irrigation, which the streams of this country afford, is by no means sufficient to render productive all the land which is otherwise suitable, but by careful management a large part of it may be brought under cultivation. In the Great Plains the amount of arable land is measured directly by the quantity of water brought to them by the streams, as there is undoubtedly far more land, suitably situated in other respects, than the streams can water. In the mountains, while in some of the larger valleys, and especially in the Great Basin, this holds good, yet in the smaller valleys some streams will

unquestionably run to waste. Again, many large areas, otherwise well situated, are so high that the seasons become too rigorous for agricultural pursuits to succeed.

Numberless proofs of the fact that the soil of what has been called a desert is rich in the elements of fertility may be adduced. Salt Lake Valley was as unpromising in appearance as the "Great American Desert" before the "Latter Day Saints" attacked it, but the application of water has made it one of the most fertile regions in the world. At St. George, in Southern Utah, the victory over Dame Nature has been even more complete. So it is all over the West. The natural products of the country, even though they be *artemisia*, grease-wood, and *cactus*, are no indication of the barrenness of the soil. Because a soil naturally produces these only, it by no means follows that these only *can* be produced. To condemn the country because, under its natural conditions, it does not produce useful grasses, timber, etc., is as unreasonable as to expect a tract of dry land to produce cranberries.

Besides agriculture, a very large interest is cattle and sheep-raising. The cattle ranch consists generally of one or more houses built of logs, near which are log stables and *corrals*—yards enclosed by strong high fences, built of logs set firmly on end in the ground and placed close together. The cattle belonging to the ranch range wild, the year round, on the neighbouring plains in great herds, mingled with those of other ranches, and to be distinguished from them only by the *brand* of the owner. Only once a year does the owner see his cattle—at the annual "round-ups." In the latter part of May and early in June these take place. A large number of herders are employed, and all the cattle—for many miles in all directions—are collected and run into a great corral. It is a stirring, lively scene,—the "cow boys," as the herders are called, on their half-wild Indian ponies driving in the great

bands of wild cattle, which are constantly breaking and running in all directions, pursued by the herders. Horses and men alike enter into the spirit of the scene.

Once gathered together, the cattle of each ranch-man are placed by themselves, and the calves born that spring, and which still run with their mothers, are marked with the brand of the owner. Such as are destined for immediate sale are taken out, and the rest are turned loose together on the range again.

Through most of the year the life at a cattle ranch is easy, but at certain times there is call for high powers of courage and physical endurance. There are few investments of money which pay more surely or more largely than this, but it involves a solitary semi-barbarous life, with many privations.

The Great Plains form one vast cattle range. From Texas to Montana we find them dotted over with the huts of the ranch-men, and covered with herds of cattle. They follow closely the retreating steps of the buffalo. So, in the great valleys of the mountain region, the Parks of Colorado, the Laramie Plains, the Gallatin and Bitter Root and other valleys of Montana, the great valley of California, and those of Oregon,—indeed, wherever grass grows and hostile Indians are not too plentiful,—there we find herds of cattle. Some of the cattlemen are very wealthy, numbering their cattle by hundreds of thousands.

CHAPTER X.

GEOLOGY OF THE CORDILLERAN PLATEAU.

1. *General Review.*

THE general character of the geology of the region west of the Mississippi, extending to the Pacific coast, has been given by two great lines of elevation, viz. the Rocky Mountain belt, and the Sierra Nevada and Coast Ranges. They divide the country into three belts—first, the Great Plains; second, the Basin and Plateau Region; third, the Pacific Coast trough, which includes the California Valley, and the Columbia Valley region in Oregon and Washington Territory.

The Great Plains extend from the Mississippi Valley to the east base of the Rocky Mountains.

The Basin Region stretches westward from the western slopes of the Rocky Mountains to the Sierra, and southward into Mexico as a high table-land.

The Sierra, with the Coast Ranges, form a raised margin along the Pacific Coast, and are cut by gorges, which were the gateways through which a large portion of the interior region was drained.

The Pacific Coast trough is a narrow region between the mountains and the Pacific Ocean. North of the California Valley it is nearly obliterated by the encroachment of the mountains.

2. *Rocky Mountains.*

The outlines of the western part of the North Ameri-

can continent have been approximately the same from the earliest Palæozoic time, and the Rocky Mountains existed in embryo as islands of greater or less extent in the Palæozoic seas. As the ages progressed it is probable that the islands, some of which must have had continental proportions, grew smaller and smaller, until some of them disappeared beneath the surface of the ocean; for the whole Rocky Mountain region was affected by a gradual and progressive subsidence which continued into Tertiary time, when the mountains were uplifted to assume almost the shape they have at present. Since their elevation, however, they have been enormously eroded. They are divided into numerous sub-ranges, as the Colorado Range, Park Range, Medicine Bow Mountains, Wind River Range, Yellowstone Range, and Missouri Range. These extend north-westward into British America. In these sub-ranges the nuclei are the Archæan rocks, from which the Palæozoic, Mesozoic, and even Tertiary strata dip away in all directions. These nuclei represent the original Archæan islands, which, as Newberry has remarked, have been "the hinges upon which the great plates of the continent have turned—lines of weakness where the changes of level experienced by the continent have been most sensibly felt."

Colorado, which has the highest mass of the Rocky Mountains, has probably always been highest above the Palæozoic and Mesozoic seas. Seen from the east, the Colorado Range presents a rugged front, and from its gorges come the streams which form the South Platte and Arkansas Rivers, which have for ages been carrying the products of erosion from the mountains towards the Mississippi River.

3. *The Plateau Region.*

The Plateau Region may be described as the region reaching from the Rocky Mountains westward to the

Wahsatch Mountains, and southward to Mexico. A portion of the Great Basin is also included, but that is reserved for separate consideration. The Plateau Region is frequently called the Colorado Plateau, as the Colorado River is the principal stream draining it. It is the

THE ARAVAYPA CAÑON IN ARIZONA.

southern portion of the great central table-land or basin region, and was probably contemporaneous in its elevation with the Rocky Mountains. Newberry, in one of Hayden's *Annual Reports*, thus describes it :—" It is apparent that this high plateau, which stretches away for several hundred miles west of the Rocky Mountains, was once a

beautiful and fertile district. The Colorado, draining then as now the western ranges of the Rocky Mountains, spread over the surface of this plateau, enriching and vivifying all parts of it." The cañons of the Colorado have been well described by Professor Powell. The total length of the gorge or chasm is nearly 1000 miles, and it is from 3000 to 6000 feet in depth, cut through the entire series of sedimentary rocks, from the Tertiary to the granite, and even 600 or 800 feet into the latter. "Just in proportion as the Colorado deepened its channel, the region bordering it became more dry, until ultimately the drainage from the mountains passed through it, in what may be termed underground channels, and contributed almost nothing to the moisture of the surrounding country. The reason why the walls of this cañon stand up in such awful precipices of thousands of feet is that the perennial flow of the stream is derived in far distant mountains. Almost no rain falls upon its banks; and when any portion of the bordering cliff has passed beyond the reach of the stream, it stands almost unaffected by atmospheric influences."—(Newberry).

Scattered throughout the Colorado Plateau are several groups of mountains, which rise like islands above the general surface. They are evidently eruptive in their origin, and were comparatively rapid in their growth. They were, however, not volcanic, for the rocks which form them have not spread beyond the centres, where they have lifted dome-like masses of the sedimentary rocks, which frequently are but slightly broken.

Such mountains are the Sierra la Sal, the San Francisco Mountains, the Henry Mountains, the Sierra Abajo, Sierra el Laté, and Sierra Carriso.

4. *The Basin Region.*

The Great Basin of the West comprises the vast area

that stretches eastward from the Sierra Nevada to the Wahsatch Mountains. It is composed of a multitude of smaller basins or valleys, each of which has its lakes, springs, and watercourses.

This high table-land is a hydrographic basin, whose waters have no visible outlet to the ocean.

Ever since Carboniferous time this region has formed a portion of the continent, although subject to many oscillations.

Scattered over it is a series of remarkable short isolated mountain ranges, separated by valleys whose soil puts desolation in a stronger light. These mountains rise like islands above the desert plains. As Clarence King says, they lie traced across the desert with a north and south trend, and are ordinarily the tops of folds whose deep synclinal valleys are filled with Tertiary and Quaternary detritus.

The northern portion of this central plateau was at times disturbed by the most violent volcanic action from craters, many of which can still be seen. "From these came showers of ashes, which must have covered the land and filled the waters of the lakes so as to destroy immense numbers of the inhabitants of both. These ashes formed strata, which were, in some instances, ten or twenty feet in thickness. At other times the volcanic action was still more intense, and floods of lava were poured out, which formed continuous sheets hundreds of miles in extent, penetrating far into the lake basins, and giving to their bottoms floors of solid basalt. When these cataclysms had passed, quiet was again restored, forests again covered the land, herds dotted its pastures, fishes peopled the waters, and fine sediments, abounding in forms of life, accumulated in new sheets above the strata of cooled lava."—(Newberry).

It is obvious that this Great Basin region was once

occupied by vast fresh-water lakes, which were separated by areas of dry land, on which a luxuriant vegetation flourished, and over which herds of great mammals roamed.

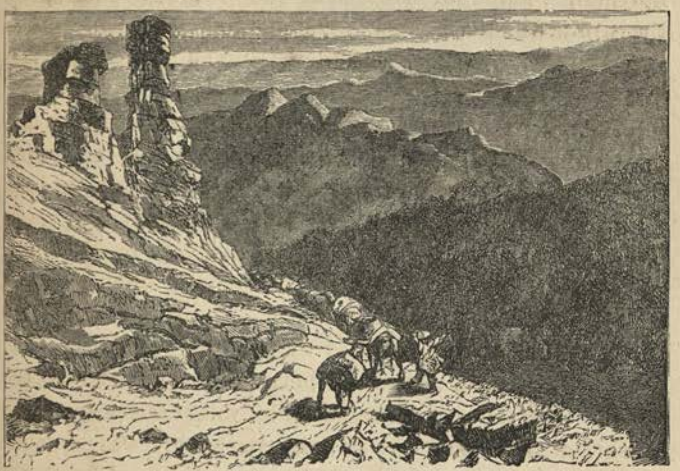
The smaller ranges of mountains were scattered over these lakes as islands, their summits projecting above the surface. The Klamath Lakes, Salt Lake, and Pyramid Lake, are the remnants of these vast bodies. In the northern portion of the basin the drainage effected by the Columbia River was so complete that in many places the sediments which accumulated in the lakes have been cut to a depth of two thousand feet.

In the central portion, however, the waters gradually and slowly passed away by evaporation, and the briny waters have concentrated in the lake basins which have no outlet. Of these Great Salt Lake is a typical specimen. As a salt lake it is of comparatively recent origin. Several times the valley must have been filled high up on the mountain-sides with water—water, too, with very little of the saline character that it now possesses. The complete drainage of the northern and southern portions of the plateau so reduced the water surface of the area, that the moisture in the atmosphere was so much diminished that the dry hot air licked up the water from the undrained lakes, and gradually reduced them to their present dimensions. Although many streams have for ages been pouring a vast volume of water into Salt Lake, the evaporation is so rapid that it is not increased in size, but has gradually diminished. Many of the lakes of the Great Basin are marked only by alkaline plains or "salt flats," while others exist only during a portion of the year, and in the dry season are glittering sheets of salt. Those that remain as lakes are only huge evaporating pans for the drainage from the mountains.

5. *The Sierra Nevada, Coast, and Cascade Ranges.*

The Sierra Nevada is the loftiest range on the Pacific coast, and in Mount Whitney, which reaches an elevation of 14,898 feet, has the highest mountain peak within the limits of the United States excepting Alaska.

It is also the oldest of the ranges on the Pacific coast. It formed the barrier to the ocean in Jurassic,



VIEW OF THE SIERRA NEVADA.

Cretaceous, and Tertiary time, although with a much less elevation that it now has.

It is composed mainly "of granitic rocks, associated with which are metamorphic slates proved by the California Survey to be of Triassic and Jurassic age. These slates are traversed in many localities by veins of quartz, which are the repositories of the gold that has made California so famous among the mining districts of the world."

The Sierra Nevada extends from about latitude N. 41°

in Northern California to about N. 36° in the southern part of the State. It is partly volcanic in the northern portion, and its axis is continued northward in the Cascade Range, which is almost entirely volcanic.

The Coast Range is the most modern of the three, and is composed mainly of Cretaceous rocks, with Tertiary occupying the valleys between its numerous sub-ranges. "It forms a raised margin along the western edge of the continent, and has produced that 'iron-bound coast,' described by all those who have navigated that portion of the Pacific," which washes the shores of the United States.

Between the Coast Range and the Sierra Nevada lies the California Valley, and the same structure reappears in Oregon and in Washington Territory; while, between, the structure is partially obliterated by the encroachment of the mountains.

6. *Mineral Resources of the Cordilleras.*

The region of the Cordilleras produces nearly all the metals known to commerce, and its mineral resources are as varied as those of any part of the world.

Gold and silver are found in greater or less abundance in nearly every State and Territory in the mountain region and along the coast.

California and Nevada stand at the head of the gold-producing States, the latter also rivalling Mexico in its silver yield. In addition to gold, California yields copper, mercury, tin, iron, salt, and petroleum. Mercury is found at a number of localities in the Coast Range, especially at New Almaden and New Idria, two places named after the two most productive European localities.

The production of these mines, from 1850 to 1868 inclusive, was nearly 500,000 flasks. In 1878 the pro-

duct of California was 62,479 flasks. New Almaden is about 58 miles south of San Francisco. Copper was found near Los Angeles in 1840, but in the search for gold the copper resources of the Pacific coast were neglected, and remained undeveloped until 1860, since which time copper has been an important article of export.

When the petroleum of Santa Barbara County in Southern California first attracted attention it was thought it would exceed in quantity that of Pennsylvania. The price of the Pennsylvania oil fell so low that, together with the high price of labour in California and difficulty of transportation, it rendered the development of the California oil-fields unprofitable. There are no flowing wells, and the oil is collected from the surface of pits where it collects as a scum. The petroleum is different from the Pennsylvania oil, being devoid of the lighter naphthas, and containing no paraffin. The burning oil made from it has also a higher density.

Borax is found in the waters of several lakes both in Nevada and California, but it is only in the Coast Range that it is found in a crystalline form. It is now an important manufacture in California, and the importation of borax has almost entirely ceased. The production in 1875 was 5,000,000 pounds. Salt forms an important item in the economical resources of Nevada, and sulphur is also abundant, being used in the manufacture of sulphuric acid. The discovery of the gold-fields of British North America drew thousands of adventurers from California, and in their search for new fields of wealth they wandered into Oregon, Idaho, and Montana, developing the resources of those territories, which are principally in gold and silver.

Utah has not been as well developed as some of the other regions on account of the hostility of the Mormons

to mining enterprises. In Arizona and New Mexico the apathy of the inhabitants, who are largely of Spanish and Mexican descent, and the hostility of the various Indian tribes, has prevented the development of the mineral resources of a rich mining region. The Spaniards, in their conquest of New Mexico, mined for gold, silver, and copper, but the valuable mines have all been abandoned. The want of transportation has also operated against the pursuit of profitable mining.

Colorado is rich, not only in gold and silver, but in her coal-fields, which is also the case with Wyoming and Utah. The coal is known as bituminous lignite, and is found widely distributed and in great quantity. No anthracite is found except in small deposits, where it has been metamorphosed by local volcanic action. Geologically this coal belongs to the debatable ground that lies between the Cretaceous and the Tertiary formations. To the vast treeless plateaus and valleys of the mountain region these coal deposits are of incalculable value.

The yield of gold and silver for the year from July 1st, 1877, to July 1st, 1878, in the several States and Territories, is given by the Director of the United States Mint as follows:—

	Gold.	Silver.	Total.
California . .	$15,260,676	$2,373,389	$17,634,068
Nevada . . .	19,546,513	28,130,350	47,676,863
Montana . .	2,260,511	1,669,635	3,930,146
Idaho . . .	1,150,000	2,200,000	1,350,000
Utah . . .	382,000	5,208,000	5,600,000
Arizona . . .	500,000	3,000,000	3,500,000
New Mexico . .	175,000	500,000	675,000
Oregon . . .	1,000,000	100,000	1,100,000
Washington . .	300,000	25,000	325,000
Dakota . . .	3,000,000	none	3,000,000
Colorado . .	3,366,404	5,394,940	8,761,344
	$46,951,107	$46,601,314	$93,552,421

The total product from all other portions of the United States for the same period was $400,000, the gold principally from North Carolina and Georgia, and the silver from the Lake Superior region.

The following Table gives the production of the precious metals in the United States up to 1875 :—

1848 to 1858 inclusive	$555,550,000
1859	50,100,000
1860	46,150,000
1861	45,000,000
1862	43,700,000
1863	48,500,000
1864	57,100,000
1865	64,475,000
1866	63,500,000
1867	65,225,000
1868	60,000,000
1869	62,500,000
1870	66,000,000
1871	65,500,000
1872	61,750,000
1873	72,500,000
1874	73,000,000
1875	74,817,596
Total	$1,575,367,596

Prior to 1861 California stood at the head of the States, but since that time the bullion product of Nevada has exceeded it.

7. *Gold.*

Gold is found widely distributed throughout the Cordilleran region. The placers, which contain it in its native state, disseminated in sand and gravel, are the richest and most profitable sources of the metal. Placers have been found of greater or less extent in every State and Territory of the mountain region. The first dis-

coveries in a gold-mining region are naturally in nearly all cases of this class. They yield the auriferous product easily, and are rapidly exhausted. Enormous amounts of gold have been taken from them. The placers of California yielded, in the four years from 1850 to 1854, inclusive, $201,000,000, and Alder Gulch in Montana has alone produced more than $30,000,000. Following the exhaustion of the placers comes the search for the sources of the gold in the surrounding mountains, where the permanent wealth of the region lies. The range of the vein deposits is equally extensive with the placers. Gold occurs free in quartz veins; in combination with various sulphurets such as pyrites, and associated with silver as in the ores of Nevada. In California the gold found in place is chiefly free; in Colorado it is found in copper and iron pyrites in ores that are difficult of treatment; and in Nevada it occurs not only native, but associated with silver in sulphurets and tellurids.

In California it was as placer deposits that the first discoveries of gold were made. Its existence in the region was known long before the date commonly ascribed to its discovery. The Mexicans, at various times from 1775 to 1828, found small placer deposits near the Colorado River, but carried on no profitable mining.

In 1838 the placers of San Francisquita were discovered, and worked thereafter steadily for twenty years. James D. Dana, who visited the coast in 1841 with Wilkes's exploring expedition, discovered gold in the Sacramento Valley and in Southern Oregon.

The discovery of the rich fields of the Sacramento Basin at the west base of the Sierra Nevada was accidental.

While engaged in digging a race for a sawmill at Coloma on the American River in January 1848, James Marshall found pieces of a yellow metal which he sup-

posed was gold. When the fact was demonstrated beyond a doubt in the following March, the men at work on the mill abandoned everything else in the search for gold. The rumour of the discovery spread, and on May 29th the Californian newspaper published in San Francisco said—"The whole country from San Francisco to Los Angeles, and from the seashore to the base of the Sierra Nevada, resounds with the sordid cry of *Gold! Gold! Gold!* while the field is left half planted, the house half built, and everything neglected but the manufacture of picks and shovels, and the means of transportation to the spot where one man obtained one hundred and twenty-eight dollars' worth of the real stuff in one day's washing, and the average for all concerned is twenty dollars per diem."

By July the number of persons employed on the American River was 4000, who were obtaining from $30,000 to $40,000 a day, and by November four or five millions of dollars had been extracted.

In the spring of 1849 a stampede from all parts of the world to the Golden State began. It was the most extensive emigration the world has ever seen. Everybody hurried to the New Eldorado. Mechanics, merchants, professional men, with a large admixture of the worst elements of mankind—all mingled in a mad rush for gold. Adventurers poured into California from all quarters of the globe: from Mexico, Chili, and Peru; from the Sandwich Islands, China, and New Holland; from the United States and Europe. During the six months between the 1st of July 1849 and the 1st of January 1850, it is estimated that 90,000 persons arrived in California from the east by sea or across the plains, and that one-fifth of them perished by disease during the six months following their arrival, such were the hardships they had endured, and the privations to

which they were subjected. From the troops which were stationed in the State, hundreds—officers as well as privates—deserted and went to the mines. Mining was the universal occupation, and it was almost impossible to get or keep servants. The western slope of the Sierra Nevada was covered with explorers, and every ravine or gulch where there was a chance of finding the precious metal was prospected. Mining towns sprang into existence with incredible activity, and presented scenes of busy life. The currency in common use was gold dust. When payments were to be made, if scales were at hand, amounts were weighed out; if not, they were guessed at, or measured in a spoon. All were rich — a gold-dust aristocracy. The community was a peculiar one. Gathered from all classes of society and from all civilised nations with extraordinary rapidity, it would have been strange had it not been so. At first law and order were unknown. Everybody was too busy in getting rich to provide protection to his riches other than he could afford himself with revolver and knife. The bad elements revelled in this state of society, and for a long time he who was quickest with his six-shooter, and surest in his aim, ruled the camp, and ordered things according to his own will. This primitive but barbarous simplicity could not long continue. The civil authorities were too weak, or were indisposed to cope with the "roughs;" and at last the law-abiding citizens were obliged for mutual protection to combine and take the law into their own hands. Conflicts, more or less bloody, ensued between the "Vigilantes" and the "roughs." Scores of the latter were killed; some shot; others, after a form of trial, hung; while the rest, dismayed by the fate of their comrades, fled from the country to participate in like scenes elsewhere; so, finally, the community was purged of its most violent elements.

The "Vigilantes," finding their mission ended, handed their power over to the lawfully-constituted civil authorities, and disbanded. Many blamed these self-constituted dispensers of justice, and undoubtedly they made mistakes—undoubtedly innocent men suffered; but at the time, and under the circumstances, they did the best that could be done.

This picture of the early mining days in California has been repeated, on a greater or less scale, in nearly every mining locality in the West.

In 1851 the yield of gold in California was $65,000,000, which is greater than it has ever been since. The placer diggings were soon exhausted, and then began the "rushes," or sudden migrations, that have taken place periodically ever since.

Men who had never earned more than a dollar a day before they went to California were dissatisfied when they were making twenty, and were prepared to go to any new field of excitement. No story was too extravagant to be believed. Tracts in the midst of sage-covered deserts, miles from mineral-bearing veins, were located, companies formed, and, considerable sums of money expended in searching for mines in places where they could not by any possibility exist.

In 1853-54 there was a rush to Australia and Peru in search of placers that were never found.

In 1858 eighteen thousand men went from California to Fraser River, in British Columbia; but before the end of the year five-sixths of them had returned, and in 1860 the silver excitement spread through California, and was followed by the rush to Nevada. In 1859 and 1860 also the Pike's Peak excitement drew thousands to Colorado, while Montana and Idaho were the new fields in 1862-64.

The San Juan region of Colorado attracted a large

share of attention in 1873-74, to be followed in 1875-76 by the Black Hills excitement.

The latest rush has been that to Leadville, Colorado, which began in 1877.

Gold was discovered in Colorado in 1858, and in 1859 California Gulch, the richest ever worked in Colorado, was discovered, and in 1860 it swarmed with placer miners. In the first four years after the discovery of gold in Colorado, $30,000,000 were shipped mostly from placers. The total product to 1878, inclusive, has been estimated at $80,000,000. The discovery of precious metals in Idaho and Montana was made in 1862, and in 1864 Alder Gulch in Montana was thronged with miners, and yielding almost fabulous amounts of gold. The gulch has been worked over and over again, and is still profitable. It has been only within a few years that quartz mining has begun to supersede the placer mining in this portion of the country.

The Black Hills lie partly in Wyoming Territory and partly in Dakota, two thirds of the area lying within the latter. It has long been known that they contained rich deposits of gold, but it was not until 1874 that the richness and extent were practically tested by expeditions sent out by the United States Government. The Indians claimed the region, and would not sell it. When definite information in regard to the resources reached the east, a grand rush began. At first the Government tried to keep the miners out, but their efforts were unsuccessful. A western newspaper correspondent gives the following account of Deedwood, the principal town, in 1877 :—

"Here was a mountain crowded city of five or six thousand inhabitants, extending several miles up two narrow defiles, intruding upon other similar cities, and making as much fuss and bluster as eastern towns of a

century's growth. There were log cabins and frames in every conceivable altitude, tents on the hill-side, and solidly-built business blocks along the narrow thoroughfares in the gulches, and the hills were fairly ringing with the clang of the hammer and saw on the dozens of new structures going up. The din of dozens of stamp-mills reminded one of the old districts of Colorado, and the business done by over two hundred shops and mercantile houses was simply marvellous. Three daily newspapers, three banking houses, and some thirty hotels and eating-houses, were here crowded with business, where two years ago the amiable Sioux was reading his title clear and swearing he would have $80,000,000 for the country or die in the last ditch. Two or three variety theatres, and one furnishing the legitimate drama, were crowded nightly. The veteran actor, Jack Langrishe, was running the place of amusement last referred to. When business grew dull, he wielded a graceful editorial quill on the *Pioneer*, and when it grew duller in winter, he went down into the gulch, boiled water to thaw out the frozen ground, and made good 'pay' from his claim."

So great was the frenzy that seemed to seize people in regard to the Black Hills, that all sorts of evils were predicted for the region, but, unlike the condition in the early days in California, good order prevailed. Organisations were effected in nearly every camp, and stringent regulations adopted as soon as claims were staked off, and disputes as a rule were amicably settled.

The total production of gold in the United States, from 1847 to 1873, inclusive, was $1,239,750,000, of which $986,800,000 came from California. The gold yield of California reached its culmination in 1853, when it was $65,000,000. It gradually fell to $40,000,000 in 1861, when Nevada began to yield; and it has decreased steadily year by year since that time.

8. *Methods of Gold Mining.*

The first mining operations were simple, each miner depending for his profits on the pan and the rocker. In the former he dissolves the gold-bearing dirt, picking out the stones with his hand. When all the dirt appears to be dissolved, so that the gold falls by its weight to the bottom of the pan, he tilts it a little so that the thin mud and light sand run out. This is repeated until all except the metal has been washed out.

CHINESE GOLD-WASHER.

The "Rocker" is something like a child's cradle. On the upper end is a riddle with a sheet-iron bottom which is punched with holes. In this riddle the auriferous dirt is placed, and a man rocks it with one hand, while with the other he pours in water. The water, by the agitation, dissolves the clay, and carries it with the gold into the floor of the rocker, where the metal, which is heavy, is caught by transverse cleets, while the muddy water and sand run off at the lower end of the rocker which is open.

New and more expeditious methods soon became necessary, and water was supplied by ditches and flumes, and the "tom" which had been used in Georgia for years was introduced.

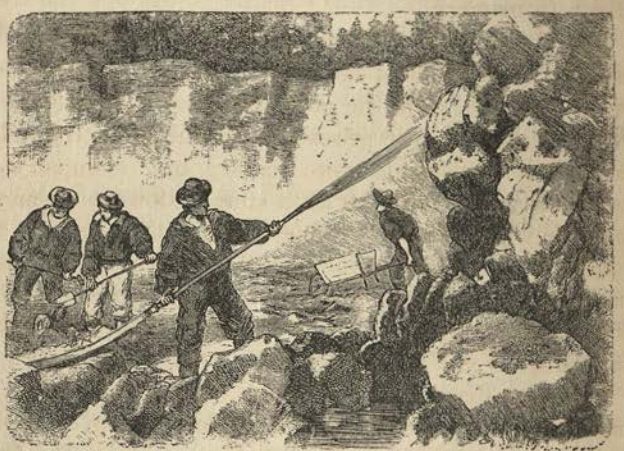
It consists of "a trough about 12 feet long, 8 inches deep, 15 inches wide at the head, and 30 inches at the foot. A riddle of sheet-iron punched with holes half an inch in diameter forms the bottom of the tom at the lower end, so placed that all the water and the mud shall fall down through the holes of the riddle, and none pass over the sides or end. The water falls from the riddle into a flat box with transverse cleets or riffles, and these are to catch the gold.

"A stream of water runs constantly through the tom, into the head of which the pay dirt is thrown by several men, while one throws out the stones too large to pass through the riddle, and throws back to the head of the tom the lumps of clay which reach the foot without being dissolved."

The tom was soon superseded by the sluice, which is a board trough from a hundred to a thousand feet long, with transverse cleets at the lower end. These catch the gold, which sinks on account of its weight. With a descent of one foot in twenty, the water rushes through the sluice in a torrent, bearing down stones and tearing the clay and earth to pieces. At the head, the miners simply throw in the dirt, and at regular times take out the gold. At first the sluice was made short, but it was afterwards lengthened to a mile or more, especially when the gold was in fine particles. It was found desirable to devise some method by which the earth could be supplied faster, and the hydraulic process was invented, by which a stream of water was directed under heavy pressure against a bank or hill-side containing placer gold. The earth thus torn down was carried by the water into the sluice, and the expense of shovelling saved. While with the sluice alone four cubic yards of earth could be washed in a day; with the hydraulic and sluice combined, fifty, or even one hundred and fifty, could be washed.

The auriferous clay was sometimes hard, and often required to be loosened by the powder blast. High hills of gravel could now be attacked, and river mining soon became unprofitable to any except Chinamen, who worked for lower pay than white men would accept.

As the placer diggings became exhausted, it was natural that the rocky veins from which the placer gold came should be searched for, and in hundreds of instances the gold was traced from the placers to the quartz lodes



HYDRAULIC GOLD-DIGGING.

in the hill-sides, growing coarser as the source was approached. Such discoveries were made in 1850, and companies were soon formed by which millions of dollars were invested in machinery to work quartz mills. Superintendents with the wildest ideas were sent to erect them, and in most cases the machinery was useless, the superintendents incompetent, and the ventures complete failures. For many years the mill-castings were objects of ridicule on the wharves of San Francisco.

The development of quartz mining, unlike that of the

placers, has been slow, and, unlike them also, has not been subject to sudden decline.

The first successful quartz miners were Mexicans, who introduced the *arrastra*, which consists of a small circular stone pavement, in the centre of which stands a post with an arm extending from it. To this is hitched a mule which drags around a heavy piece of granite, between which and the pavement the quartz is pulverised, and when fine the gold is separated by washing and amalgamation with mercury.

The Americans at first erected costly steam-mills and employed a multitude of labourers ; and not knowing how to select the rich from the poor quartz, about three out of every four quartz enterprises was a failure. Gradually, however, improvements were made; iron stamps were used ; instead of falling with a simple downward movement, they were made to come down with a twist ; the concentration and chlorination of sulphurets has been introduced ; and at present quartz mining forms a source of mineral wealth to nearly every State and Territory of the "Great West" of the United States.

The first discoveries are made by prospectors and in placers. The following excellent description of a prospector is given by the Earl of Dunraven in *The Great Divide* :—

"The general character of the country where placer mines exist may be said to be a series of deep gulches, frequently dry in the height of summer, but carrying foaming torrents after heavy rains and in snow-melting time; leading at right angles into a principal valley, and combining to form a little river, or, as it would be locally called, a creek. This principal stream courses in a broad valley through the mountains for, perhaps, 60, 80, or 100 miles, and at every two or three miles of its progress receives the waters of a little tributary torrent, tearing

through the strata in deep cañons for ten or twelve miles, and searching the very vitals of the hills. Down these gulches, cañons, and valleys are carried the yellow specks torn from their quartz and feldspar cradles, hurried downward by the melting snow, and battered into powder by falling boulders and grinding rocks, till they sink in beds of worthless sand and mud, there to lie in peace for ages amid the solitudes of primeval forest and eternal snow. Some fine day there comes along a dirty, dishevelled, tobacco-chewing fellow—'fossicker' as they would say in Australia; 'prospector' as he would be called in the States. Impelled by a love of adventure, a passion for excitement, a hatred of 'the town and its narrow ways,' and of all and any of the steady wage-getting occupations of life, he braves summer's heat and winter's cold, thirst and starvation, hostile Indians and jealous whites; perhaps paddling a tiny birch-bark canoe over unmapped unheard-of lakes, away to the far and misty North; or driving before him over the plains and prairies of a more genial clime his donkey or Indian pony, laden with the few necessaries that supply all the wants of his precarious life—a little flour, some tea and sugar tied up in a rag, a battered frying-pan and tin cup, a shovel, axe, and rusty gun. Through untrodden wastes he wanders, self-dependent and alone, thinking of the great spree he had the last time he was in 'settlements,' and dreaming of what a good time he will enjoy when he gets back rich with the value of some lucky find, till chance directs him to the gulch. After a rapid but keen survey he thinks it is a likely-looking place, capsizes the pack off his pony, leans lazily upon his shovel, spits, and finally concludes to take a sample of the dirt. Listlessly, but with what delicacy of manipulation he handles the shovel, spilling over its edges the water and lighter mud! See the look of interest that wakens up his emotionless face as the

residue of sediment becomes less and less! Still more tenderly he moves the circling pan, stooping anxiously to scan the few remaining grains of fine sand. A minute speck of yellow glitters in the sun; with another dexterous turn of the wrist two or three more golden grains are exposed to view. He catches his breath; his eyes glisten; his heart beats. Hurrah! He has found the colour! 'and a d—d good colour too.' It is all over with your primeval forest now; not all the Indians this side of Halifax or the other place could keep men out of that gulch. In a short time claims are staked, tents erected, shanties built, and 'Roaring Camp' is in full blast, with all its rowdyism, its shooting, gambling, drinking, and blaspheming, and its under-current of charity, which never will be credited by those who value substance less than shadows, and think more of words than deeds."

9. *Silver.*

Silver is as widely distributed through the Cordilleran region as gold. Nevada, Colorado, and Utah are at present the principal silver-producing States. Nevada yields more than one-half of the silver product of the United States. The Comstock Lode at Virginia City, Nevada, is probably the richest deposit of silver in the world. The estimated product of the lode from 1861 to 1874, inclusive, was more than $169,000,000, or about the same as that of the score of veins at Potosi, Mexico, for the first fifteen years after their discovery in 1545.

There is no other authentic record of the extraction in one year of nearly $23,000,000 in gold and silver from one lode, which was the product of the Comstock in 1874. The bullion has one-third of its value in gold and two-thirds in silver. Nevada ranks high as a

gold-producing State. In 1878 it yielded more gold than California. When gold was first discovered in Nevada by Mormon emigrants in 1850, the presence of silver was not suspected. The ores were not recognised when seen, but considered as interfering with the mining of the gold.

The silver is found mainly in combination, although deposits of native silver are not rare. The commonest ore is galena, which is generally rich in silver, unlike that of the Mississippi Valley. It also occurs as sulphuret, chloride, and telluride, especially in Nevada. At Leadville, Colorado, it occurs with carbonate of lead, and the ore resembles yellow sand in its appearance. The following Table shows the production of silver from

1848 to 1858, inclusive .	$550,000
1859	100,000
1860	150,000
1861	2,000,000
1862	4,500,000
1863	8,500,000
1864	11,000,000
1865	11,250,000
1866	10,000,000
1867	13,500,000
1868	12,000,000
1869	13,000,000
1870	16,000,000
1871	22,000,000
1872	25,750,000
1873	36,500,000
1874	35,681,411
1875	41,080,287
1876	39,885,916
1877	45,846,109
1878	36,151,396
Total . .	$385,445,119

10. *The Comstock Lode and Virginia City.*

Silver was first discovered in the region of Virginia City in 1857, but it was not until 1859 that the surface outcroppings of the Comstock Lode were found. The first locators who discovered silver were Peter O'Reilly and Patrick M'Laughlin, who staked a claim on the present site of the Ophir mine. The ore they discovered was a rich sulphuret of silver, in an excavation made for a reservoir to collect water to wash for gold in the ravine below. Some of the dark gray stone was taken to San Francisco, where it was assayed, and a ton and a half sold for $3000 a ton.

In 1858 a claim had been located on the lode by James Fennimore or Finney, who was known as Old Virginia, and from whom Virginia City derived its name. Comstock was a character familiar in the neighbourhood as "Old Pancake." He demanded a share for the reason that he owned the water privilege. It is said also that he purchased the claim from Finney. At any rate, he succeeded in attaching his name to the lode, which attracted thousands of miners, and has since 1860 yielded more than one-tenth of all the silver produced throughout the world.

Immediately the lode was claimed for miles, and an unparalleled excitement followed. The following extract from a letter, written at Virginia in 1860, gives a vivid picture of the excitement:—

"One cannot help thinking, as he passes through the streets, that all the insane geologists extant have been corralled at this place. Most vehement is the excitement. I have never seen men act thus elsewhere. Not even in the earlier stages of the California gold movement were they so delirious about the business of metalliferous dis-

covery. Hundreds and thousands are now here, who, feeling that they may never have another chance to make a speedy fortune, are resolved this shall not pass unimproved. They act with all the concentrated energy of those having the issues of life and death before them. They demean themselves not like rational beings any more. Even the common modes of salutation are changed. Men on meeting do not inquire after each other's health, but after their claims. They do not remark about the weather, bad as it is, but about outcroppings, assays, sulphurets, etc. They do not extend their hands in token of friendship on approaching, but pluck from their well-filled pockets a bit of rock, and, presenting it, mutually inquire what they think of its looks. During the day they stand apart, talking in couples, pointing mysteriously hither and yon: and during the night mutter in their sleep of claims and dips and strikes, showing that their broken thoughts are still occupied with the all-absorbing subject. I shall be able to convey to your readers some idea of the intensity of this mining mania, when I assure them that this portion of the American people do not even ask after newspapers, nor engage in the discussion of politics. Little care they whom you choose President; conventions and elections, wars and rumours of wars, are nothing to them. They have their own world here. Here, bounded by the Sierra and the mountains of Utah, spread over the foothills and the deserts, is a theatre beyond which their thoughts are not permitted to roam; to this their aspirations and aims are all confined. Whatever of energy, ambition, and desire are elsewhere expended on love, war, politics, and religion, are here all devoted to this single pursuit of finding, buying, selling, and trading in mines of silver and gold. Everybody makes haste to be rich; and so great is the mental tension in this direction, that it may well be questioned whether, if a sweeping disap-

pointment should overtake them, many will not be reduced to a condition of absolute lunacy."

Within a few months after the discovery of silver, nearly all the valuable claims on the Comstock ledge had passed from the hands of the original locators, leaving them in general poor, while they might so easily have become millionaires. This is the usual history in all mining regions.

Virginia City, which is situated on the Comstock Lode, is at the east foot of Mount Davidson, and is the chief city of Nevada. It was founded soon after the discovery of the Comstock, and is laid out on a precipitous site. It is 52 miles from Reno, one of the stations on the Union Pacific Railroad, at the terminus of the Virginia and Truckee Railroad. It is unattractive in appearance. The present population is about 25,000. In 1860 it contained an hotel and a newspaper office, with a population of 2345. The newspaper office consisted of a shed and one room. The former was used as a cooking, dining, and sleeping place by editors, reporters, and compositors, and the latter answered as an editorial, typographical, and advertising department combined.

Laws were necessary to control the lawless adventurers who flocked to the city, and a code was adopted, which was brief, practical, and unencumbered with legal verbiage. Any municipality which finds its own voluminous statutes inadequate might try it to advantage. There was no prison, and the two punishments prescribed for all offences were hanging and banishment.

The population of Virginia City is cosmopolitan. Nearly one-half is probably foreign. "Piute and Washoe Indians in picturesque rags, Chinamen in blue and black blouses, brawny Cornishmen, vehement Mexicans, and many other people from far-apart countries, mingle and

surge along in the stream" that is constantly rushing through the principal thoroughfare.

While night falls on the visible town, "the invisible town underground is glimmering with a thousand lights, just as it has been glimmering through all the summer days and all the winter nights that have lowered ever since the Comstock Lode was first penetrated by a shaft. There is no repose in that mysterious region; none of the endless changes and renewal of seasons that sweeten existence on the earth; no relapse of day into night, or night into day; no summer, no winter, and no Sunday. Nearly one-fourth of the whole population is hidden in the mines; and when we see how overcrowded the superficial area is, and realise how many more streets and people are out of sight; how the crest of the mountain is the roof of a seventeen-story building which is constantly sinking deeper into the earth, we are prepared to agree with the proud citizen who assures us that Virginia is a pretty considerable place."

The Comstock Lode has been traced over 27,000 feet on the surface, and has been actually explored 19,000 feet, within which space the principal mines are located. A depth of over 2600 feet has been reached (in 1879). It is situated in a heavy belt consisting principally of metamorphic rocks. In the middle of its course it occupies the line of separation of prophylite, a volcanic rock, and syenite. The former makes up both walls of the lode at other places. The main geological characteristics are the same that mark the greatest silver-bearing veins of Spanish America, and its general features are like those of other great argentiferous veins. Its ores are rich beyond any depth which miners can reach.

In 1859 the yield of bullion was $50,000; in 1860, $100,000. In 1868 it was $16,800,000, after which it diminished to $7,528,000 in 1869. In 1874 the yield

was $22,400,000; in 1875 it was over $22,000,000; and in 1876 the total yield of the State was over $40,000,000, a large proportion of which came from Virginia City.

"In the winter of 1874-75 the great discoveries were made that added the Spanish word *bonanza* to the vernacular. The technical meaning of the word, which has long been in use among American miners, to whom it was introduced by Mexicans, is a large rich body of ore; but it has found wider acceptance in the sense of an unexpected and brilliant stroke of good luck. Its antithesis is *borrasca*, which means barren rock, bad luck, or adversity."

Among the early prospectors who went to Virginia City in 1859 was Mr. Adolph Sutro, who was impressed with the magnitude and importance of the discovery. He conceived the idea of running a tunnel to drain the vein at a depth of 2000 feet below the surface. It was begun in 1869, and has been driven at the rate of 7 to 11 feet per day, and will reach the vein at a distance of 19,790 feet from the mouth of the tunnel. The work is carried on by the Sutro Tunnel Company, and, when completed, will have cost about $4,500,000. It will not only drain and improve the ventilation of the mine, but also obviate the use of the expensive hoisting apparatus, as the ore will be taken out through the tunnel to reduction works at the mouth. It will also enable explorations to be carried to a much greater depth, as the immense power of the hydraulic column will be at the service of the miner.

Although the expense of the tunnel is great, the saving by its use will be far greater.

11. *Utah, Idaho, and Colorado.*

Although silver ores were discovered in Utah as long ago as 1863, the policy of the Mormon authorities was opposed to mining by their people, and it was not until the summer of 1870 that the development of the Emma Mine gave an impetus to the mining enterprises of the Territory. In 1876 ninety districts had been opened. The ores are mainly argentiferous galena and carbonate of lead. Brigham Young, President of the Mormon Church, said in 1868, "What we used to call lead, and dig and melt up into bullets, these fellows call silver now! But if anybody is fool enough to come and mine for it, he may do so, and welcome!" They did come and mine, and the bullion product of the Territory for 1874 was over $5,000,000, mostly in silver. Utah has never been subject to the excitement that usually characterises new mining districts, and it is probably due to the fact that capital is necessary for the development of the mines of the Territory.

The Emma and Flagstaff Mines, both operated by English capital, have been the most famous mines of Utah, but for several years have been involved in litigation, so that their productive working has been interfered with. The following shows the silver yield of Utah up to 1875:—

1870	$1,000,000
1871	2,079,000
1872	2,345,279
1873	3,725,775
1874	3,819,508
1875	2,955,923
	$15,925,485

The first mining operations in Montana and Idaho, as in all the Territories, were in gold placers, but lately

silver mining has become equally prominent, and will assume still greater importance in the future.

The discovery of silver in Colorado dates back to that of gold in 1859. It is found in all the gold-mining districts of the State, and extends through the mountain region in extensive belts. The ores are argentiferous galena and carbonates, black sulphurets, antimonial silver, chlorides, ruby silver, and native silver.

Silver mining began to assume importance in 1866-67. The first mine opened was in Summit County, at the head of Snake River, a tributary of the great Rio Colorado. Discoveries were also made in Clear Creek County, and for a long time Georgetown was the centre of the most productive silver mining. In 1871 rich deposits of silver were found on Mount Lincoln and Mount Bross at the north-west corner of South Park, and in a few years were producing large quantities of silver ore.

In 1873 the San Juan region began to claim attention. Its remoteness from the settled portions of the State, with the difficulty of transportation, has retarded the development of this region; but it promises to be one of the best mining regions in the State. Many of the ores are of low grade, but the lodes are frequently of huge dimensions. 1874 was the first year in which the production of silver exceeded that of gold in Colorado. The total production of silver in Colorado, from 1866 to 1872, inclusive, was $1,114,543; since then it has been largely increased, as the following Table shows :—

1873	$839,000
1874	3,086,023
1875	3,012,902

This increased production has been maintained since 1875, and will probably be increased when the Leadville mines become fully developed.

12. *Leadville, Colorado.*

Leadville, Colorado, is the scene of the latest mining excitement, and people flocked to it in great numbers in 1879. It is situated in California Gulch, a tributary of the Arkansas River, on the west side of the Park Range of mountains. It was discovered in 1859, and worked for gold in 1860. For several years afterwards it was peopled by from eight to ten thousand miners, who were strung along the creek washing for gold. In 1873 the entire population of the gulch was scarcely a hundred, and the old houses left by the former inhabitants were in ruins. In 1876 a poor miner discovered what has since become the famous Camp Bird Mine, and the gulch has again become the site of flourishing towns. As a silver-producing region it bids fair to excel its gold-producing record, and it was the richest gold-producing gulch in Colorado. The ore is principally argentiferous carbonate of lead, which is found beneath a layer of trachyte. The Carbonate mine, in six months, produced $65,000 worth of ore from a shaft 45 feet in depth, with three levels, the longest of which was not over 25 feet. Some of the ore yields from 240 to 270 ounces of silver to the ton, and lies like a coalbank between the trachyte and limestone. The ore resembles yellow sand, and can be taken out simply with the pick and shovel—powder is scarcely ever used; and the average cost of mining is said to be under $5 per ton.

Railroads are being rapidly built to reach the Leadville region, and when completed will render profitable many other mines in the vicinity that do not at present pay. Colorado has therefore the prospect of some day rivalling Nevada in the production of silver.

13. *Coal.*

The coal deposits of the Cordilleran region are extensive and numerous. It is probable that no party of emigrants ever crossed the Rocky Mountains without finding outcrops of coal at some point on their line of march. All the early explorers, mention its occurrence. The first mention of the formation in which it is found is made in the reports of the expedition of Lewis and Clarke to the Rocky Mountains in 1804.

The coal-beds are generally of great size, and are for the most part free from impurities. The coal is usually called lignite, although it is in reality a bituminous coal, containing a large proportion of water, which detracts from its calorific power. On exposure to weather it crumbles readily, and it has therefore to be protected. For locomotives and domestic purposes it is well adapted, and the scarcity of timber in most of the regions where it occurs renders it of almost incalculable value.

The extent of the coal areas cannot be estimated at present. They may be conveniently divided into five basins or areas—viz. the Northern, the Colorado, the New Mexico basins, the Union Pacific deposits and Pacific Coast deposits.

The Northern basin includes the region of the Upper Missouri River, where the deposits of lignite were first found. This basin is almost entirely undeveloped. The Colorado basin lies mainly along the eastern edge of the mountains, extending from Cañon City northward towards Cheyenne, Wyoming. Cañon City, Golden City, and the Boulder Valley are the principal localities of coal-mining operations.

In the western and south-western portions of the State coal occurs abundantly, and in the Elk Mountains anthracite has been discovered in limited areas. It is

not true anthracite, but is a bituminous coal from which the volatile constituents have been driven by the heat attending the eruption of trachytic rocks, in connection with which it is found. Similar anthracite has been found in New Mexico. Coking coal has lately been found in Colorado and Utah.

The New Mexican basin is as extensive as that of Colorado, although not so well developed. Coal is found along both sides of the Rio Grande, in the Pecos Valley, at the Placiere Mountains, and south of the Raton Hills.

The three principal coal localities in Wyoming Territory, along the line of the Union Pacific Railroad, are at Carbon, Rock Springs, and Evanston. Of these, Evanston is the most important. The miners at the latter are mainly Chinese, and in 1872 the average amount of coal mined was about 1000 tons daily. This has since been increased. Coalville in Utah has long been a source of supply for Salt Lake City and other Mormon settlements. From all these localities the coal is approximately of the same character, the percentage of carbon ranging from 44 per cent to 54 per cent.

The coal deposits of the Pacific coast are divided by Mr. Gabb, a geologist who investigated them, into two distinct groups geologically: the one, including all the workable coals of California and Washington Territory, is Cretaceous; and the other, which is Tertiary, contains coal at numerous localities from Alaska to Cape San Lucas.

Bellingham Bay, in the extreme north-western corner of Washington Territory, is the site of one of the largest and best coal-mines on the Pacific coast. The bed is about fourteen feet thick, nine feet being available for mining. The coal is of fair quality, the only impurity being a small quantity of sulphur. The mouth of the mine is only about a quarter of a mile from the harbour,

GEOLOGICAL MAP
OF THE
UNITED STATES
AND PART OF THE
TERRITORIES OF CANADA
GULF OF MEXICO
MEXICO

where the coal is shipped on vessels. At Nanaimo, Vancouver's Island, is another mine that has been extensively worked. It was owned and worked originally by the Hudson Bay Fur Company. The coal from this mine commands a good price at San Francisco.

Other localities are Challam, Washington Territory, Coos Bay in Oregon, and New Idria and Monte Diablo in California. At the latter place there are a number of mines which furnish a large part of the coal supply of San Francisco.

This, like all the coal from the later geological formations, is soft and more or less friable, breaking readily with much handling. All contain a considerable proportion of water.

The amount of these coals brought to San Francisco annually is between 200,000 and 300,000 tons.

CHAPTER XI.

HISTORICAL SURVEY.

1. *General Discovery and First Settlement.*

Of the two political regions whose leading physical features have been sketched in the foregoing chapters, the great republic of the United States is undoubtedly the most important. Compared with British North America, it is more highly favoured, by reason of its more southern position, which, combined with its seemingly inexhaustible natural resources, unites all the conditions required for the development of a prosperous and well-ordered community, especially allowing for the growth of population, the first and most indispensable basis of all social culture. There has here been developed a complicated federal system of States, in many respects without a parallel in the history of human progress. The United States of America, which in 1876 celebrated the first centenary of its political existence, presents the singular spectacle of a nation, composed not of one, but of many peoples, presenting the only genuine example known to history of the application of republican principles to a numerous and varied population. From this point of view alone it may be well to bestow a cursory glance on the origin and growth of the United States.

When and by whom the first discovery of America was made is wrapped in obscurity. It is quite well established that in very early ages the Northmen, coming

from Scandinavia or Iceland, discovered the shores of Labrador and of New England; but they did not people the country, and the traces of their occupancy are very scanty, and tell little of the history of their voyages.

On June 24, 1499, the continent was rediscovered by John Cabot, a Venetian, then in the service of England and was named the "Tierra de Prima Vista." The northern regions of the American continent at first found little favour with the Spaniards, being by them described as worthless lands ("tierras de ningun provecho"), because they apparently yielded none of the precious metals. This one condition had, even before the discovery of America, largely determined the course of Spanish settlement, since they were almost exclusively attracted by the glitter of gold and silver. On this thirst for gold, displayed by the Spaniard, many moral sermons have been preached. At the same time, it should be remembered that but for it few settlements could have been formed beyond the Atlantic towards the close of the fifteenth century. All agricultural colonies attempted to be formed by the English and the French on the eastern seaboard during the sixteenth century were literally starved out. Cut off from the home country, where a distribution of labour had been made, the settlers, after consuming the provisions which they had brought with them, must have necessarily sunken to the social condition of the natives, unless constantly supplied with stocks of manufactured goods from the old world. But such supplies were attended with a great advance in price, owing to the many risks at that time inseparable from a voyage across the ocean. Nor could the prices be covered by the produce of the land, for this, even if obtained for nothing, would not yet pay the cost of the homeward trip.

2. *Rise of the English and French Settlements.*

Hence it was that Virginia, the first purely agricultural colony, did not begin to thrive till the opening of the seventeenth century, when a profitable return freight was at last found in tobacco. Thus it is mainly owing to tobacco, and perhaps also to the fur trade, that the present population of North America is of Anglo-Saxon origin. The fact that Canada was formerly purely French, and is still half French, is also due to another natural product of those regions. Round about Newfoundland lie incredibly rich cod-fishing grounds, and even so early as the beginning of the sixteenth century a return cargo of stock fish was found to pay, because even in mediæval times it had to be brought from Iceland. Since the year 1503 Newfoundland was yearly visited by Breton fishermen from the north of France, who have given their name to Cape Breton.

Sailing from those well-known waters, Jacques Cartier discovered the St. Lawrence, and following in his wake the French found their way to Canada. To blossom into fruit, a first settlement must above all be able to supply a profitable return cargo; but once it has struck root, it grows like the mustard seed of the gospel parable (Peschel, *Völkerkunde*, p. 219).

In this masterly sketch the whole historical development of the North American colonies is shadowed forth in few but bold strokes. We feel how they must have had to contend at first with cruel misadventure, but once the conditions of their existence secured, how they could not fail to enter on an almost unchequered career of progress. And so it came to pass. Merely for the purpose of completing the picture, it may here be mentioned that it was Sir Walter Raleigh who in 1585 led the first colony to the shores of Chesapeake Bay. It was by him

named Virginia in homage to the maiden state of his sovereign mistress, Queen Elizabeth of England, whose fame the "Poets' Poet" was even then preparing chivalrously to sing as the

> "Goddesse heavenly bright,
> Mirror of grace and Majestie divine,
> Great Ladie of the greatest Isle, whose light,
> Like Phœbus' Lamp, throughout the world doth shine."

3. *Spread of the English Power.*

But this first attempt came to naught, nor was it till about the year 1607, in the reign of James I., that the English settlements in the lands lying between the 34th and 45th parallels began to acquire a firm footing. They were soon followed by the Dutch and the Swedes, who took possession of isolated strips along the coast, the first founding the settlement of New Netherland, with its capital New Amsterdam, the present New York, the latter settling first in Delaware and afterwards in New Jersey, but ultimately giving way to the Dutch. But before the close of the seventeenth century Dutch and Swede alike had passed under the rule of England, which was thus enabled to impart a certain stamp of uniformity on all her colonies on the eastern seaboard.

The English now found themselves face to face with the Spanish domain on the south, and the more thriving French dominions on the north. The European contests, mostly fanned by the ambition of the Bourbon monarchs, to become masters in the Old, caused the flames of war to extend to the New, World. The long struggles that ensued resulted in the total expulsion of the French from the Northern Continent, where England henceforth reigned supreme. Of their former power in these regions the French have retained nothing but certain fishing rights in the Newfoundland waters.

4. *Democratic and Religious Character of the Early English Settlements.*

Religious and political oppression at home had driven most of the early English colonists to found these first settlements on the eastern shores of North America. Thus the northern colonies of New Hampshire, Massachusetts, and Rhode Island were established by religious enthusiasts between the years 1621 and 1638, all four being united in 1643 under the name of New England. In the same way, the Catholic Lord Baltimore in 1628 founded for his co-religionists the settlements of Maryland, with the town named after him on Chesapeake Bay. Thither were attracted the persecuted Catholics in Europe, especially the Irish and Germans from the Palatinate. In 1681 the Quaker William Penn, with many of his adherents, settled in Pennsylvania, and built Philadelphia, the "city of brotherly love."

All these British North American colonists enjoyed from the first large democratic liberties, for the Puritans, constituting by far the greater number of the immigrants, had succeeded in carrying out a political and social system based on the strictest republican principles. It was of course easier to accomplish this in America than it would have been in a country like Europe, which was occupied from time immemorial by a dense population cultivating almost every square acre of land. In the New World, the ground, with all its natural fertility, had first to be cleared, and was in the meantime called upon to support but a very scanty population. At that time the total area of the settled districts may have been some 320,000 square miles, with not more than 1,400,000 inhabitants in 1749, and in 1775 about 2,803,000,—that is to say, nine Europeans to every square mile.

In such extensive districts where vast distances sepa-

rated neighbour from neighbour, the personality of each individual is naturally brought into play far more than could be the case in crowded communities, nor is anyone powerful enough to impose an arbitrary yoke on the unwilling necks of men living so much apart. In the early English colonies the only law unreluctantly submitted to was that of the Church, which, resting on the broadest possible basis, thus acquired paramount and undue influence in temporal matters. Not only was the whole political organisation of the several colonies subordinate to it, but became in its hands a mere instrument for the acquisition of those higher aims that happened to constitute the essence of true Christianity in the eyes of the various sects for the time being in the ascendant. Everything became subject to its sway, while towards nonconformists each predominant sect displayed an unrelenting spirit of the most crushing intolerance. And not only could this despotic oppression fully reconcile itself with the principles of the most unfettered political freedom, but, as a faithful expression of the unrestricted will of the people, acquired an irresistible power from those very principles themselves.[1]

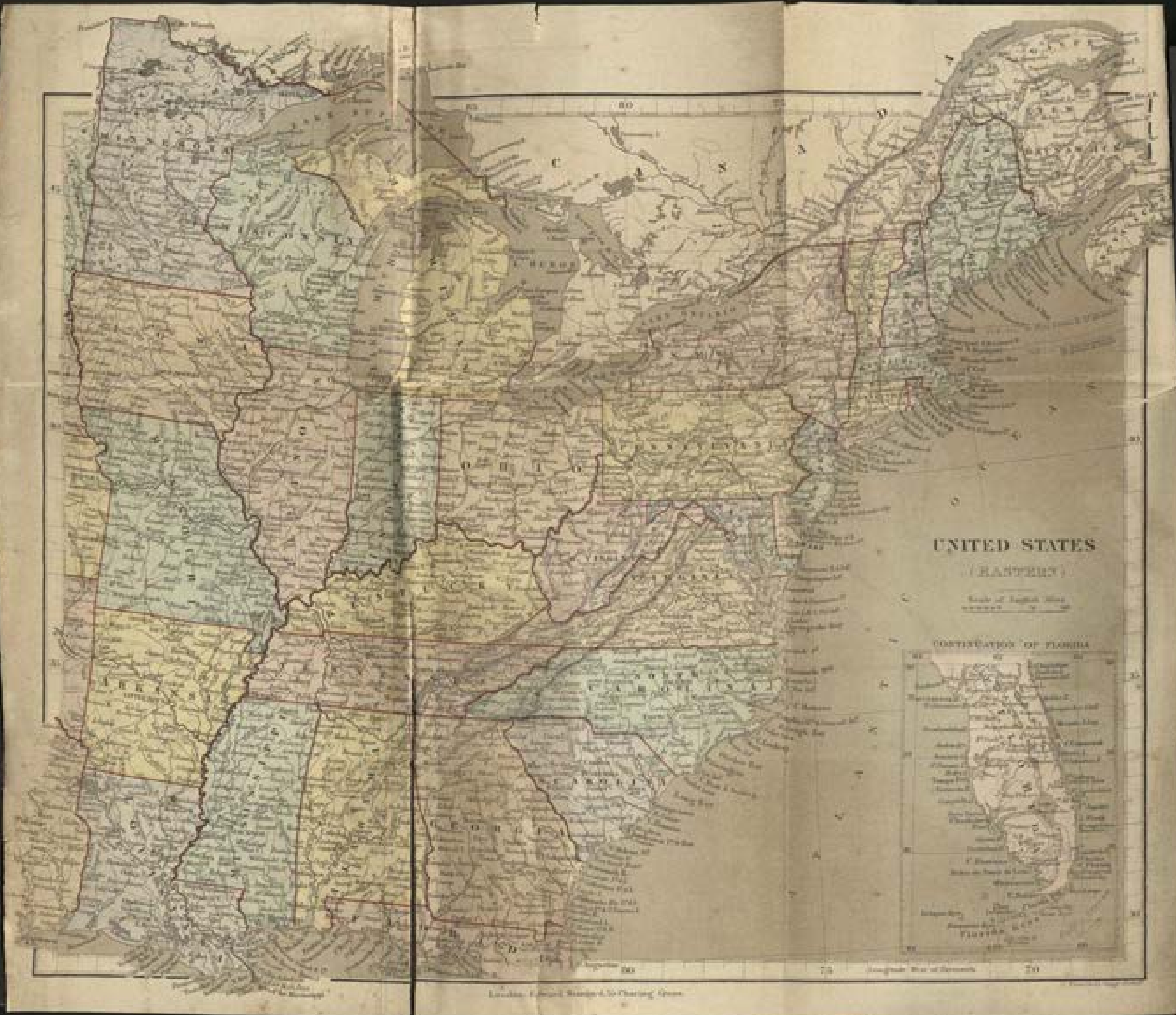
5. *Political Enfranchisement and Adoption of Republican Principles.*

Accustomed to act in the most arbitrary manner towards the native Redskins, now slowly retiring beyond the mountains before each successive wave of immigration throughout the eighteenth century,—encircled by wide domains, a circumstance of itself favourable to the ideas of freedom, and thrown upon their own resources in their struggles with stubborn nature,—the New Englanders could not fail to cherish and develop those maxims of liberty

[1] John H. Becker, *Die hundertjährige Republik.*

and equality they had inherited from their forefathers. Hence the refusal of the Home Government to allow them a voice in voting the taxes they had to pay became a sufficient motive for the War of Independence, and when the thirteen Federal States proclaimed their political freedom on July 4th, 1776, the only form of government they could possibly adopt was that of a commonwealth. This need not therefore be regarded as the triumph of any abstract principle, but rather as a simple matter of necessity, according, as it fully did, with the other social conditions of the colonists at that time. Nor did the new order of things involve any fresh step in the development of human progress, but flowed rather from the tenacious spirit of conservatism by which the American people were still animated. Hence, in asserting their political freedom, they proclaimed no new theories, but merely retained the old institutions and sentiments of personal liberty which are the heirloom of the Anglo-Saxon race, and which from the first found a genial home in that portion of the New World settled by them.

European champions of freedom, such as Lafayette and Kosciusko, finding the progress of events in America to harmonise with their political views, were induced to take an active part in the struggle, which, after a protracted warfare of eight years, resulted in England's fully recognising the independence of the united provinces at the Treaty of Versailles, in 1783. The leading men in the contest were Benjamin Franklin, who succeeded in securing many influential friends for the young republic in Europe, and above all, George Washington, no less wise in council than valiant in the field. Washington (born 22d February 1732, in the county of Westmoreland, Virginia, died 14th December 1799, at Mount Vernon) must be regarded as the true founder and sustainer of the new State. After his death, a federal city,


UNITED STATES
(EASTERN)
CONTINUATION OF FLORIDA

already founded in 1791, was built almost in the centre of the republic as then constituted, and being destined as the seat of Congress, received the appropriate name of Washington.

6. *Federal Union—Progress of Events.*

Congress had hitherto represented the united provinces in all foreign matters, but each province now became a separate State, retaining its own original constitution. They had already concluded a reciprocal treaty of union amongst themselves in 1787, referring to a central congress the charge of all general affairs. At the head of the federation was a president chosen by vote, and entrusted with the executive. This office was limited to four years, but with the option of re-election, and George Washington was naturally the first appointed to fill it in the year 1789.

Under the first three presidents the finances of the country were organised, the public debt partly liquidated, partly funded and guaranteed, the savage Indian tribes either reduced to peace or semi-civilised, agriculture greatly encouraged, commerce developed to an extraordinary extent, the population increased beyond all precedent, and the territory of the Union considerably enlarged by the acquisition of extensive regions. This rapid increase of power and prosperity suffered a brief interruption through the war with England in 1812, which, however, was brought to a conclusion the next year. Since then, although various complications frequently threatened to involve the Union in fresh wars, it continued to enjoy the profoundest peace till the year 1846, when it engaged in a successful war against the neighbouring Mexican Republic.

7. *Spread of the Union to the Pacific.*

Meantime, as crystals radiate round a given centre, one region after another had been attracted to the Union during the first fifty years of its existence. Spreading with extraordinary rapidity from the Atlantic seaboard over the Alleghanies to the banks of the Mississippi, and thence still westwards to the Rocky Mountains, it at last found its natural limits on the shores of the Pacific Ocean. Like an irresistible flood, the Anglo-Saxon race and all its satellites swept over the almost uninhabited regions of the West, establishing itself there with a rapidity of which history offers no second example.

8. *The Civil War—Its Causes and Results.*

At present the States seem to have reached the reasonable limits of their expansion, though many, blindly overlooking the actual possibilities, would seem to anticipate the day when the whole western hemisphere will acquiesce in the supremacy of the American Eagle. The brilliant progress already achieved might to some extent justify such a dream, for the nation had hitherto passed from one triumph to another. The Mexican campaign had ended with the acquisition of fresh territory, and as there now remained no dangerous rivals to overcome, the nation began to entertain a too complacent conviction of its own invincible power and superlative excellence. But the hitherto almost unchequered career of victory received a heavy blow in the great civil war that raged from 1861 to 1865, presenting to contemporaries the sad spectacle of a free people tearing itself to pieces in a fratricidal contest entailing greater sacrifices of life and property than any other war recorded in the annals of the world.

The causes of this colossal struggle, ending in at least

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a seeming victory for the Union, lay deeply rooted in the natural conditions of the land itself, and must be traced back to the earliest years of the confederation. They flow, in fact, in the last instance, from the essential antithesis of agricultural States to those in which the land is occupied with plantations. The Northern States alone are adapted to the exclusive cultivation of cereals; hence here alone communities could spring up under conditions similar to those of the temperate zone, to which Europe mainly belongs. On the other hand, these regions are incapable of yielding products restricted by nature to the tropical and sub-tropical lands, but which have yet become indispensable requirements of human culture, and consequently form the most important articles of international trade. Foremost amongst these is cotton, and farther south sugar and coffee, all of which flourish in hot climates alone, and must be raised on plantations.

But one of the best attested, though often readily overlooked, principles of ethnology clearly teaches that the physical no less than the moral and intellectual development of individual races is bound up with definite climatic conditions, that cannot be disregarded with impunity. Thus the white-skinned European has been moulded in the more temperate regions, and the Teuton especially thrives but indifferently in warmer latitudes. Where he does to some extent succeed, it is only on the condition of exemption from all heavy manual labour. Indeed, it may be confidently asserted that, as a rule, the European is incapable of hard work in the tropics.

But of the above-mentioned products of the soil, cotton and sugar are cultivated in the Southern States alone, and require an amount of physical exertion of which the white settlers were and still are incapable in that climate. Hence arose the necessity of procuring more suitable labour, and so early as 1619 the Dutch introduced the

first negro slaves into North America. For the negro is unquestionably the most enduring worker in the hot regions, which are as indispensable to his development as are the temperate lands for the European.

But the African at the same time confirms another ethnological lesson, to the effect that no savage race will ever be induced, except by necessity, to undergo serious exertion. The negro was consequently reduced to the condition of a slave, and the States of the Union were, according to their geographical position, from the first divided into two great classes—the Slave and the Free States.

The whole interior life of the Union has hitherto turned upon these conflicting elements. Under the influence of the philanthropic ideas of the last century there arose, but of course in the Northern or Free States only, numerous opponents of slavery, aiming at first at the suppression of the slave trade, and then at the abolition of the detested institution itself. So early as April 6, 1776, Congress forbade the further introduction of slaves. But all the more rapidly did the negroes increase in the Southern States themselves. At the same time there was now also developed that sharp contrast between those States which on moral grounds condemned slavery, further declaring it unnecessary according to the teachings of political economy, and those which laid greater stress on the inherent difference in the races of mankind, while pronouncing slave labour indispensable to prevent vast regions hitherto yielding the most lucrative returns from again lapsing into wildernesses.

It is unquestionably true that with the institution were associated a series of abuses, leading to much cruelty and harsh treatment of the negroes—abuses which found expression even in the legislative enactments of individual Slave States. At the same time, unprejudiced historical inquiry,

as contrasting with such passionate representations as those of Mrs. Harriet Beecher Stowe, has shown that in general the treatment of the negro was not barbarous, and that many seemingly cruel laws were urgently needed as measures of self protection on the part of the whites.

But not only was a yawning gulf opened by the slave question between North and South, but in the South itself the gap was widened between the white and black man. Miscegenation resulted in every variety of half breeds, who inherited not only the physical beauty of their parents, but many of the higher qualities of their fathers. All those of mixed blood, however little they might be tainted by the negro element, were held as slaves. Indeed, many men held their own children in this degraded condition, nay, even sold their own daughters, knowing what fate might be in store for them. The sharply-drawn lines of aristocracy of blood rigorously excluded those in the least tainted with negro blood from society.

The aversion which races of different blood entertain one for the other is not the result of prejudice, as many suppose, and as many philanthropists assert, but is rather a feeling deeply planted in human nature, everywhere and at all times revealing itself in many ways. Equally incontestible is the pre-eminence, both intellectual and moral, of the white race, which thus forms a natural aristocracy in the truest sense of the word. But in the Southern Slave States this natural aristocracy was soon converted into an actual one, which, in the possession of slaves and in the produce of slave labour, found the means of acquiring vast wealth. But this was again counterbalanced by the defect inherent in all aristocracies, here enhanced by the demoralising influences produced by slavery itself on the slaveholder. The cotton-planters, sprung most of them from the best blood of England, developed into a chivalrous and hospitable race, enjoying the higher culture of the

European universities, but having solely in view the maintenance and defence of their own exclusive rights. As, on the other hand, influence never fails to follow in the wake of wealth, the South inevitably gained the ascendancy over the North, and became the leading power in the body politic.

In the Free States of the North the process of development had been essentially different, and, on the whole, much more in accordance with the European standard. Here society stood, fortunately, in no need of slavery, and here consequently arose no aristocracy of colour exempt itself from the necessity of labour, but, on the contrary, living on the sweat of the black man. Here all were equal, every man could work, and prosperity became universally diffused throughout all classes. The stream of European immigration was—by the climatic conditions—directed rather towards the north than the south, where there would have been no alternative between physical extinction or the renunciation of the prevailing love of enterprise. The immigrants further contributed a cumulative amount of intelligence, together with an accession of numbers, soon causing the population of the Northern States to surpass that of the South.

Thus it came to pass that in the field of politics the Northern majority was governed by the Southern minority, a relation which must, sooner or later, inevitably lead to an open rupture. The situation became still more critical with the constant accession of fresh territory, whose geographical position did not call for a corresponding extension of slavery, and consequently tended to increase the material superiority of the North over the South. The smouldering embers of mutual ill-feeling began for the first time to be violently stirred up in 1820, on the question whether Missouri was to be a Free or a Slave State. But the matter was for a time set at rest by the so-called

Missouri compromise. According to this famous agreement Missouri was admitted as a Slave State, while slavery was forbidden in any States thereafter to be formed north of latitude 36° 30′.

This compromise preserved peace between the sections until 1850, when the discovery of gold in California, and the consequent rapid settlement of that territory, entailed the necessity of adding it to the Union as a State. Again party spirit ran high, and open threats of dissolution of the Union, unless California was made a Slave State, were uttered. Another compromise again prevented a rupture. This, known as the "Omnibus Bill," admitted California as a Free State, forbade the slave trade in the District of Columbia, and required the arrest and return of escaped slaves by the Northern States.

But no compromise could satisfy party spirit for any length of time, but tended rather, more and more, to whet the appetite for the coming struggle. In the North there arose the party of the Abolitionists, frankly demanding the total and unconditional suppression of slavery, and rallying under its banners all who pretended to be regarded as liberals in the country. To them were opposed the Democrats, including all the Southern politicians in whose hands the chief power was at that time concentrated. With the increasing bitterness of party feeling the arrogance of the South became all the more intensified, the cry went forth that "Cotton was King," and that his power should be recognised as supreme in the land.

Matters became further complicated by the prominence assumed in the year 1854 by the so-called "Know-nothings," who would have nothing to do with the old political factions, but proclaimed the doctrine of union at all costs. But this party soon disappeared from the arena.

In the contest raised by this burning question of the

abolition of slavery, all the civilised world was naturally arrayed on the side of the North. During the interval between December 1860 and May 1861, the Southern States of South Carolina, Mississippi, Florida, Alabama, Georgia, Louisiana, Texas, Virginia, Arkansas, and North Carolina, withdrew from the Union, constituted themselves into a confederacy under a rival president, and boldly accepted battle from the far more powerful Northern States. During the protracted and sanguinary civil war that ensued, fortune inclined at first towards the South, which, though fewer in numbers, had the advantage of a disciplined army commanded by skilful leaders. The struggle was fought out to the bitter end, and the South yielded only when its resources were completely exhausted, and when it had no more troops to send into the field.

During this war, slavery, the one bone of contention, was abolished by a proclamation from President Lincoln, as a necessary war measure. Thus the South, in their vain attempt to protect their "peculiar institution," afforded its opponents the opportunity and the power to free the country from this foul stain.

9. *Reconstruction of the Union.*

The Southern States having been conquered and thus restored to the Union, there remained the difficult task of rebuilding the States and of reconciling the white population to the situation of affairs. An almost universal amnesty was declared, both whites and blacks were given the right of suffrage, and the recently rebellious States were readmitted to the Union. In spite of this generous treatment on the part of the Government, the rebellious spirit still exists, and only awaits opportunity to break forth again. By putting the ballot into the hands of the ignorant negroes, the situation was very much complicated.

For several years after the war these people, led by white immigrants from the north, many of whom were unscrupulous demagogues, or worse, held the controlling power in most of these States, and ignorant government and the grossest corruption ran riot in the South, already impoverished by the war. Finally, the whites, driven almost to desperation by this course of misrule, accomplished by force and terrorising what they could not do by the ballot, and succeeded in getting control of the State governments, which they now hold to the benefit of the whites and the injury of the blacks.

Meanwhile the whole country has gone through a great industrial collapse, from which it is but now emerging,—a collapse the causes of which are easily traceable to the late war. This war, producing an enormous market, stimulated production to an unprecedented degree,—a production which went on at an accelerated pace after the war was ended, and the market which it afforded was closed. The great rise in prices, attendant on the war, was not succeeded at its close by a corresponding fall consequently the Americans could not compete in foreign markets. Hence arose a condition of over-production and glutted markets, which could only be relieved by one of two things: a reduction of production, or an opening of new markets. That the former method of cure is now unconsciously being resorted to, the armies of unemployed workmen testify; and the large and rapidly increasing balance of trade, in favour of the United States, shows that the latter is also assisting in its cure. That this method of treatment is correct, is shown by the gradual and steady revival of business in all parts of the country.

As is natural, the depression in business leaving many, especially of the lower labouring classes, without means of earning their bread, has afforded unscrupulous and

ignorant demagogues opportunity to play upon the passions of the lower classes, by charging misgovernment, political corruption, etc., upon the party in power. This cry was quickly taken up by the democrats, who have used it persistently in their struggle to regain control of the Government, which they have not had since 1861.

CHAPTER XII.

EXTENT AND POPULATION.

1. *Boundaries and Extent.*

THE domain of the United States lies between the 25th and 49th parallels, and stretches right across the northern continent, from the Atlantic to the Pacific seaboard. It is bounded northward by British Columbia, Saskatchewan, Manitoba, Lakes Superior, Huron, Erie, and Ontario, the River St. Lawrence, and the Province of Quebec; eastward by New Brunswick and the Atlantic Ocean; on the south by Florida Channel, the Gulf of Mexico, and the Mexican Republic; on the west by the Pacific Ocean. The border or frontier lines are about 8700, that of the lakes about 870, and of the coast 5100 miles in extent; while the greatest distance, north and south, is about 1560; east and west, 2850 miles.

The Union consists at present of thirty-eight States, eight Territories, and the District of Columbia, whose political organisation will engage our attention farther on. The general physical aspect of this vast domain has already been described in the chapters devoted to the physical geography of North America. The more important details respecting the several States are reserved for the tables appended to this section.

2. *Population.*

Within the limits of the Union there resided a popu-

lation of 50,155,783 souls in the year 1880. An official census is taken every ten years, which presents the only data that can be depended upon. Since the year 1790, when the first census was taken, the population of the Union showed such a striking and uniform rate of increase as to excite universal astonishment, while sanguine calculators prophesied that the number would amount to 100,000,000 in the year 1900. But these exaggerated anticipations have been reduced to more modest estimates by the last census, taken, as stated, in 1870.

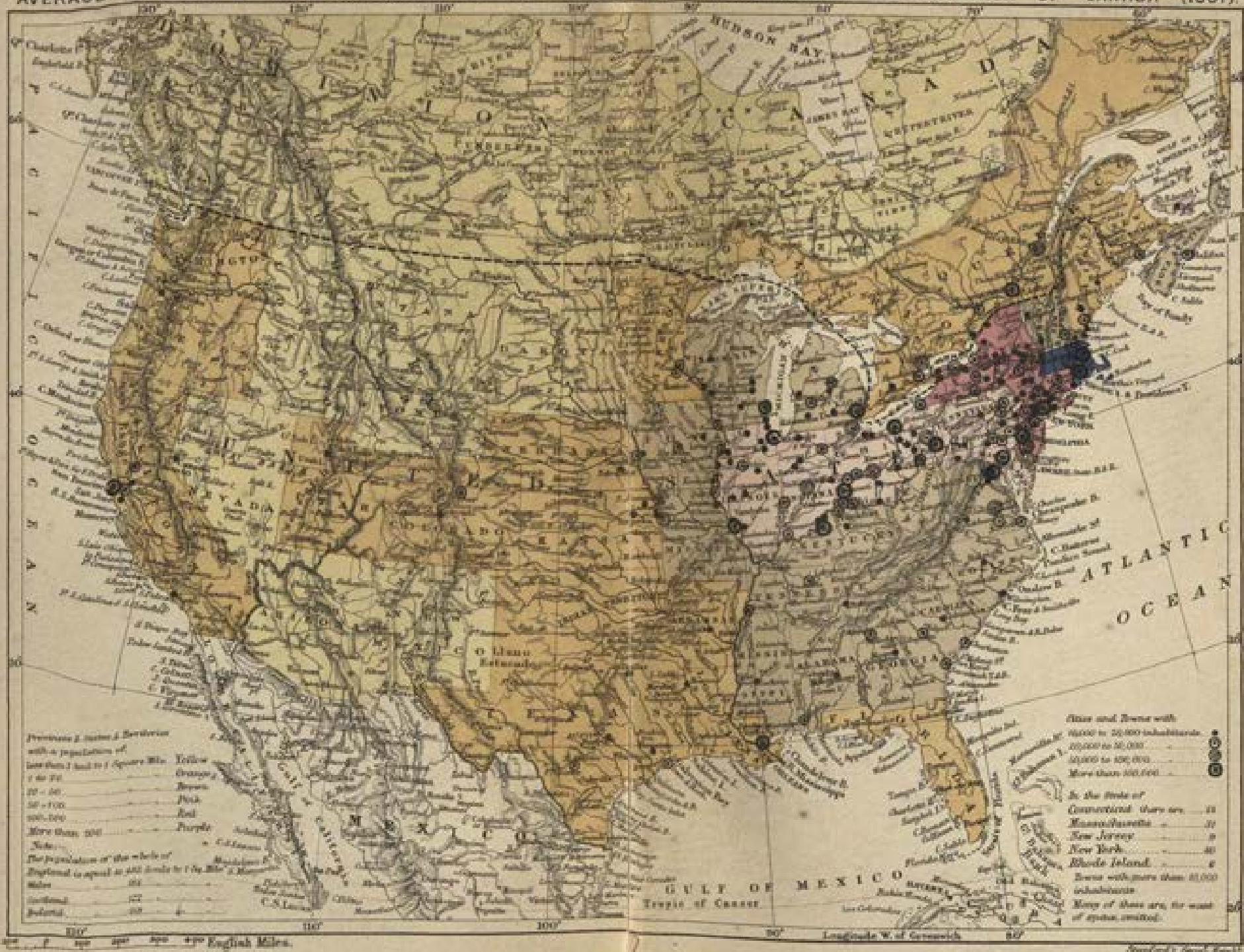
3. *Distribution of the Population.*

This population is very unevenly distributed over the territory of the Union. It is naturally most dense in the eastern Atlantic States, which were the first to be settled by Europeans. Advancing westward, it diminishes steadily in density, though important centres of population have here and there been formed along the Mississippi, and still farther westward. The most populous city is New York, which has a present population of nearly one million; the next largest cities being Philadelphia, Baltimore, and Boston in the east; Chicago, Cincinnati, St Louis, and New Orleans in the Mississippi basin; and lastly San Francisco, on the Pacific coast.

4. *American Cities.*

Owing in part, at least, to the circumstance that this is a new country, and that land is abundant and cheap outside of the cities, is the fact that in the United States it is the country, the aggregate of the smaller settlements, that holds the balance of power, whether social or political. While, in more than one sense, London is England and Paris is France, a similar proposition is not true of the United States. Boston is not New England, nor is New York

AVERAGE DENSITY OF THE POPULATION OF THE UNITED STATES (1880) AND OF THE DOMINION OF CANADA (1881).



London: Edward Stanford, 1, 55 Charing Cross.

City a fair epitome of New York State, or Philadelphia of Pennsylvania. But though the larger cities have not absorbed the country, they were making rapid strides towards such an undesirable consummation when the financial crash of 1873 came. This turned the tide in the opposite direction, and since then the labouring classes have everywhere been driven from the cities, and forced to return to the culture of the soil.

The principal cities of the Union may almost be counted on one's fingers. They are:—Boston, in Massachusetts—population, 362,535; New York, in New York State, 1,206,590; Brooklyn, in the same State, 566,689; Philadelphia, Pa., 846,984; Baltimore, Md., 332,190; Washington, District of Columbia, 147,307; New Orleans, Louisiana, 216,140; St. Louis, Missouri, 350,522; Chicago, Ill., 503,304; Cincinnati, Ohio, 255,708; and San Francisco, Cala., 233,956.

The older cities, including those on the Atlantic coast, were not at first laid out. They simply grew by a process of spontaneous generation. In the case of Boston, the streets of the older part of the city, it is said, were laid out by the cows returning from pasture, and certainly the narrow winding streets give colour to this ludicrous origin. The more recent parts of these cities, with the entirety of those in the interior, were built in accordance with plans—in regular squares, with broader streets intersecting at right angles, resembling, as has been often said, gigantic chess-boards. In many cities the streets are designated by numbers and letters of the alphabet; and in some, one hundred numbers are allowed to each square, the next square commencing with a new hundred. These arrangements are of the utmost convenience in finding one's way in strange cities, however much of the æsthetic may be lost in consequence.

In the names of the cities one notes a certain poverty.

Many are taken from well-known cities of the Old World —thus we meet with London and New London, Paris, St. Petersburg, etc. The classics are not neglected, for Troy, Utica, Alexandria, Carthage, and others have been resurrected on this western continent. The names of great men are very numerously immortalised. Washington appears in nearly every State in the Union, and in many of them a number of times, causing great confusion. In Iowa there are 44, in Ohio 39, in Pennsylvania 19, and in other States several each.

In the newer parts of the country, especially in the Western States and Territories, there are few self-styled villages. The sanguine American mind sees in every new settlement a future metropolis, and, like Minerva, it springs into being, a full-grown city. Every straggling settlement on the frontier—built, it may be, of logs—is a "city;" and the speculator in corner lots confidently predicts for it a vast future. The first building of these to-be cities is—not a church or schoolhouse—but a hotel, if a log-cabin of one room can be so-called consistently. Next, a saloon appears, and then a small proportion of dwelling-houses. When the town has passed its lawless stages,—when it has sown its wild oats and has settled down into a law-abiding community,—then churches and schoolhouses appear, and the religious and educational elements are ministered to. This is the general history of growth of settlements on the Western frontier.

Again, many of these incipient towns die prematurely. Mining excitements give birth to numberless "cities" which perish when the mines become exhausted, or, from one reason or another, work on them is stopped. The oil regions of Pennsylvania contain many of these mushroom towns which, from the failure of the oil-wells, are now in a state of decay. All over the West are deserted towns, monuments of departed placer diggings, or "played-

NEW YORK CITY.

To face page 183.

out" quartz leads. The railroads, too, contribute their quota of recent ruins. Every important railroad, during its construction, carries at its end a town—even a city in some cases. As the end of the road moves on, the town follows it. It is a city upon wheels. The houses are made of the thinnest and lightest materials, and are often carried bodily in sections from one stopping-place to another. The Union Pacific Railroad, during its construction, carried a town of several thousand inhabitants upon its end. As may be supposed, the people of this town were not of the most desirable sort. Besides the employés of the road, it consisted mainly of gamblers, desperadoes, and loose women of the baser sort. Law and order were unknown, save as administered by "Judge Lynch." Shooting was a pastime freely indulged in by both sexes and all classes. The revolver was king over the community.

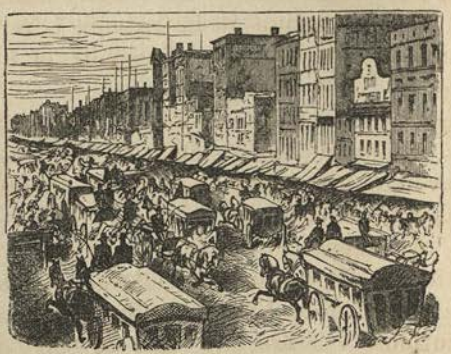
5. *New York City.*

This, the chief commercial city of the country, is situated at the mouth of the Hudson River, on the island of Manhattan. It was originally peopled by the Dutch, and by them named New Amsterdam. It is by far the largest and most important city in the country, and has a magnificent harbour, excelled by none in the world.

The older part of the city, situated at the southern end of the island, is more or less irregular in plan. But the general scheme of the city is that of long streets running north and south, lengthwise of the island, and mainly known as avenues, with cross-streets from one side to the other. The latter are numbered, commencing near Union Park, at the upper end of the old part of the city. The southern portion of the city is devoted to business, the northern portion mainly to dwellings. Broadway, though not, as implied by its name, a broad street, is the

principal among the business streets. It runs down the island in a southerly direction to its lower end.

The city contains, besides vast numbers of magnificent dwellings, many fine public buildings and business edifices. Of the public buildings, one of the most noted is the City Hall, a graceful and elegant structure, with a white marble façade; another is the new Court-House, notorious as the means whereby many were enriched from the city treasury. The Custom-House is an immense and massive structure of Quincy granite. The national Sub-



BROADWAY.

treasury occupies the old Custom-House, a beautiful and spacious building of white marble. The new Post-Office building is the finest public structure in the city, and is admirably adapted for its purpose.

With parks, the breathing-places of cities, this metropolis is well provided. The largest of these is Central Park, in the northern part of the city. It is two miles and a half long, by half a mile in width, of a rectangular shape. It is divided into two unequal parts by the Croton reservoir, whence water is supplied to the city. The surface of the park is undulating, just sufficiently to

give an agreeable diversity to the scenery. Nature had done little for it, but art has beautified it until it is one of the finest parks in the world. It is embellished with fine groves of trees and shrubbery, ponds and fountains, statuary, etc. etc.

Besides Central Park, the city contains several other open places. Among these are the Battery, Bowling Green, the City Hall Park, Union Square, and others, amounting altogether to more than a thousand acres.

The commerce of the city is enormous. Nearly 60 per cent of the foreign trade of the country passes through this port. In manufactures its importance is proportional. It contains 59 banks, representing a capital of 85 millions of dollars.

As regards means of education, the city is well provided. There are 287 grammar and primary schools, with an average attendance of about 117,000. There are several schools of higher grade, commonly known as academies, and supported in whole or in part by religious denominations. There are two colleges, Columbia, and the University of New York, both of which are flourishing institutions. There are also several schools of medicine and surgery. The city also contains no less than 23 public libraries.

The public improvements of the city are by no means all that could be desired. Most of the pavements are in bad condition. The main business streets are paved with cobble stones, than which scarcely anything could be worse, although they are being gradually replaced by Belgian blocks. Wood pavements have been tried, but there, as everywhere, they have soon decayed, leaving the streets in a shocking condition. Although the city is admirably situated for carrying out a perfect sewage system, it is yet in a bad condition. The market-houses, too, are unworthy of the great city.

The population is very mixed. Most of the lines of European steamers have this as their western port, and bring to it thousands upon thousands of immigrants from the Old World, and the worst elements of this throng of immigration remain to curse the city. The larger proportion of these are Irish, from the lower classes, and they are taken up by the Democratic party of the city, and in turn assist it in keeping political control. The result is that the city is mainly ruled, or has been in past time, by its worst, lowest elements, and a systematic pillaging of the public treasury was carried on for years with impunity. Recently, however, better men have regained control of power, and the reign of Tammany, it is to be hoped, is over.

6. *Philadelphia.*

Philadelphia, the "Quaker City," the chief city of the State of Pennsylvania, is the largest in territorial area, and the second in population, within the limits of the United States. It is situated on the west side of the Delaware River in the south-eastern part of Pennsylvania, and extends N.N.E. along the river to a point 22 miles from the mouth of the Schuylkill River, reaching 5 to 10 miles westward from the Delaware. The site was discovered in 1623 by the Dutch of New York, who soon located there. The Swedes settled along the river within the boundary of the city in 1638. By the treaty between England and Holland in 1674, the settlements of the Delaware fell under English authority, and in 1681-82 Philadelphia was laid out by William Penn. The present city has an area of 82,603 acres, and includes the entire county, which was consolidated in 1854. Previously it included only a strip a mile in width, which reached westward from the Delaware to the Schuylkill River, a distance of two miles. The portion west of the latter

stream is now known as West Philadelphia, and other parts of the city are frequently called by the names which they have retained from the time when they were under independent municipal government, such as Kensington, Richmond, and Southwark; while the outlying villages, such as Manayunk, Germantown, and Frankford, are still suburban although under the city government. The streets of the city were originally laid out to run west from the Delaware, with intersecting streets running north and south. This plan has generally been carried out wherever practicable, and almost everywhere the streets cross at right angles. The east and west streets are named, and the north and south streets numbered.

On the former the buildings are numbered toward the west, all between Front or 1st Street having numbers between 100 and 200, and all between 2d and 3d Streets between 200 and 300, and so on. The buildings on the south side have the even numbers, as 102, 104, 202, 204, etc., and those on the north side the odd numbers. On the north and south streets the buildings are numbered in either direction from Market Street, which is the central street, certain streets being designated as the boundaries of the hundreds. 14th Street or Broad Street is the central north and south street, and is built for six miles. The city nearer the Delaware is built upon for a greater distance north and south than Broad Street. The line of street lights extends along the Delaware for about thirteen miles.

Chestnut Street is the fashionable thoroughfare, and has many fine buildings of granite, marble, and brick. Brick has been always principally used for buildings, and the city is noted for its uniform rows of brick buildings, with white marble facings and steps. In the more fashionable and wealthy portions of the city, brownstone and marble are largely used.

Philadelphia is conspicuous for the number and neatness as well as durability of its dwellings. The buildings of all kinds number about 150,000, and the tenement system so common in New York is almost unknown. The average of persons to a dwelling-house is about 6·01. This fact has gained for Philadelphia the pleasant appellation of "the city of homes." In the number of its dwelling-houses it is probably only surpassed by the British Metropolis. The population in 1880 was 846,984, and about 200,000 of this will represent the foreign element, which is largely German.

The city is surrounded by a rich agricultural country, and the food supply is abundant and varied. There are about thirty-five market-houses, some of which are large, costly, and imposing in appearance.

The supply of water and illuminating gas is good, and the drainage system excellent.

The public buildings are numerous; many of them are rich and elaborate. Among them is the City Hall, which is in process of erection. It is of granite and marble, to be four stories in height, covering 470 feet by 486½ feet, and surmounted by a tower 450 feet in height. The Masonic Temple is of granite, built in Norman style. The University of Pennsylvania, which dates its foundation from 1749, has the largest and most conveniently arranged college structures in the country, built of green serpentine rock and greystone. The principal place of amusement is the Academy of Music, which has a seating capacity for 2900 persons. The Schuylkill River is crossed by fourteen bridges.

There are two parks and thirteen public squares belonging to the city. The principal one is Fairmount Park, best known for its being the site of the International Exhibition of 1876. It contains 2740 acres, and (next to Epping and Windsor Forest in England, and the Prater of

Venice) is the largest park in the world. It is situated on both sides of the Schuylkill, commencing at Fairmount, an elevation from which it derives its name, and extending for more than 7 miles along the river, and along the banks of the Wissahicken to Chestnut Hill, the total length being about 13 miles. It extends westward about $4\frac{1}{2}$ miles, and possesses much natural beauty, being well wooded and having a great variety of surface. The property was originally composed of country seats, among which were many shaded glens, ravines, and valleys. The fine old forest trees have been preserved with great care, and as the river is in view from nearly all the roads in the eastern and western portions, the diversity is charming. In Fairmount Park is also the first established American Zoological Gardens, which, although only first opened to the public in 1874, has the air and general appearance of long established similar institutions in Europe.

Philadelphia is the first manufacturing city in the Union, exceeding all others in the extent and variety of manufactures and the number of persons employed. New York exceeds Philadelphia only in the value of articles manufactured. This pre-eminence of Philadelphia is due to the plentifulness of water and the proximity of the coal-fields, together with the breadth of the space available for manufacturing establishments, and the comfort which mechanics may enjoy with their families.

The exports from the city consist mainly of breadstuffs and petroleum. The trade has been much facilitated by the establishment of new lines of steam-ships between the city and Europe. The Pennsylvania Railroad Company carries the freight directly to the ships' sides. One of the grain elevators on the Delaware has a storage capacity of 500,000 bushels, and can load three

vessels at once; and another, on the Schuylkill, has a capacity of 800,000 bushels, and can load six vessels at one time.

In 1875, the value of petroleum exported was $7,927,399. The coal shipments, generally for American use, are very large.

The steamships of the American line are of the first-class, built of iron at Philadelphia, and are the only steamships plying between America and Europe which fly the American flag. There are six main lines of steam railroad radiating from the city, besides numerous local roads.

Philadelphia was the seat of the Federal Government from 1790 to 1800, when Washington became the capital.

7. *Baltimore, the Monumental City.*

Baltimore, the principal city of Maryland, is situated at the head of navigation of the Patapsco River, near the Chesapeake Bay. In 1870 it had a population of about 267,000.

The city is mainly laid out at right angles, the buildings being principally of brick, with some of granite and iron. It contains many fine public buildings, among them the City Hall, built of white marble, and costing $3,000,000. It has excellent graded schools, in which about 40,000 children are instructed. It has several academies or minor colleges, and one, known as the John Hopkin's University, which has just been instituted on a liberal endowment, and promises to become one of the first institutions of learning in the land.

The city has many breathing places, in the form of small parks, and besides these, Patterson Park, in the north-eastern section of the city, which contains 54 acres. But *the* park is known as Druid Hill Park, which is

situated just beyond the north-west section of the city. This contains 704 acres of land, beautifully undulating in surface, and embellished by all that landscape art can supply, making it one of the most enchanting spots to be found in the neighbourhood of our large cities.

8. *Washington.*

Washington, in the District of Columbia, the capital city of the United States, is situated on the left bank of the Potomac River, about 100 miles above its mouth. Though but a few years ago a straggling, dirty, unhealthy village, it is now the finest and healthiest of American cities. Its plan is one of great beauty and symmetry. The city is laid out from the Capitol as a centre, in four sections, North-west, South-west, North-east, and South-east. The streets running north and south are numbered, starting from the Capitol; thus we have 1st Street East and 1st Street West, etc. Those running east and west are denominated by the letters of the alphabet, and we have, in similar manner, A Street North, A Street South, etc. Those streets which radiate from the Capitol towards the four cardinal points are known respectively as North, South, East, and West Capitol Streets. Besides these streets, which divide the city into rectangles, there is a system of avenues which cut the streets at angles of 30° and 60°. These avenues are named from the States of the Union, as Massachusetts Avenue, Pennsylvania Avenue, etc. The streets and avenues are wider than those of any other city of the world, ranging in width from 70 to 160 feet. The crossings of streets and avenues have, in very many places, presented opportunities for small triangular or circular parks, which serve to beautify and adorn the city, as well as to increase its salubrity. Besides these, there are many larger parks scattered about

the city, such as the Capitol Grounds, which comprise 52 acres; the grounds about the White House (the President's Mansion), containing 20 acres; those of the Smithsonian Institution, the Public Garden, the Agricultural Bureau, and the Washington Monument, in all about 100 acres; and many others, each comprising a square or two of land. The combined area of streets and public parks is slightly in excess of that held as private property; that is, more than half the area of the city is in streets and parks.

While the city contains very many fine private residences, its public buildings far overshadow all others, by their magnitude and their architectural effect. First among these is the Capitol, whose great white dome is, from all directions, the first object in the city to attract the eye. Its general plan is that of a central building, surmounted by a dome, and flanked by two wings. Its entire length, from north to south, is 751 feet, with a breadth of from 121 to 324 feet in its different portions. The building covers nearly $3\frac{1}{2}$ acres. The total cost of the building has been about $13,000,000. The height of the wings is 70 feet, while that of the dome, from the ground to the Goddess of Liberty upon the summit, is $285\frac{1}{2}$ feet. The material of the main building is freestone; that of the wings is white marble, while the dome is of iron.

The rotunda, occupying the central portion of the main building, is one of the principal attractions of the Capitol. It is a circular hall, 96 feet in diameter, by 180 feet in height to the top of the canopy above. On this spherical concave is painted a mammoth fresco by Brumidi, representing allegorical and historical subjects. The panels which surround the rotunda, nearly on a level with the spectator, are adorned with historical paintings.

The Senate chamber occupies most of the north wing.

It is 113 by 81 feet, and accommodates seventy-six senators, while the galleries have a seating capacity for a thousand spectators. This room is without artistic decorations, with the exception of the glass panels of the ceiling, which have symbolic designs. On either side of the Senate chamber are the Senate committee rooms, most of which are richly frescoed. Other rooms in this wing are richly finished in Italian and Tennessee marbles. The staircases, also, are of white and Tennessee marble.

The south wing is occupied by the Hall of Representatives and the numerous committee rooms. The hall is the largest legislative room in the world, being 139 by 93 feet, affording space for 300 members, while the galleries will seat 1500 spectators.

The Library of Congress occupies the western projection of the central building. This library comprises over 310,000 volumes, for which the space is entirely inadequate, and measures are on foot for a new library building, with increased accommodations.

The Supreme Court of the United States has its room in the central building of the Capitol.

The interior of the building is finished throughout in marbles, with floors of stone or tiles. The walls and ceilings are beautifully frescoed. It contains very many works of art, statuary, paintings, and symbolic frescoes.

The building of the Treasury Department is a vast and imposing edifice in the Ionic style of architecture, and is built of freestone and granite. The building has a length of 468 feet, with a breadth of 264, and contains 195 rooms. It cost $6,000,000.

The great building of the State, War, and Navy Departments, now in process of construction, will, when finished, be one of the finest in the city. It is in the Italian Renaissance style, and is built of granite. The

dimensions of the edifice will be 567 by 471 feet, and it will cost about $7,000,000.

The building of the Interior Department, which covers two entire squares of the city, is in the Doric style, and is of simple but massive proportions. It is of freestone, marble, and granite.

Opposite the latter is the building of the Post-Office Department, occupying an entire square. The order of architecture is Corinthian.

The President's mansion, known popularly as the White House, is situated between the Treasury and the new State Department building, fronting on Pennsylvania Avenue. It is a plain stone edifice, surrounded by extensive grounds, adorned with shrubbery, trees, and fountains.

Other public buildings are those of the Department of Agriculture, which is of brick, with brown stone trimmings, and situated in the midst of large grounds; that of the Smithsonian Institution and National Museum, built of red sandstone; that of the Army Medical Museum, which occupies the building formerly known as Ford's Theatre, in which President Lincoln was assassinated; the Naval Observatory, the Navy Yard, Arsenal, and Government Printing-Office.

Within the city and in its suburbs are many charitable institutions, supported in whole or in part by the Government. The Soldier's Home, for the support of aged and invalid soldiers, is situated a short distance outside the city, on the bluffs which surround it. It occupies a tract of about 400 acres, which, with its beautiful buildings, works of art, groves, fountains, and smooth lawns, forms a most attractive park, and is a favourite resort during the heated season. It was established by the Government, and is kept up by a small tax levied upon the pay of the soldiers of the regular army.

The Deaf and Dumb Asylum, situated just beyond the limits of the city, deserves mention. It occupies 100 acres, comprises a number of buildings in semi-Gothic style, and accommodates 100 pupils.

Among others are the Naval Hospital, the Soldiers' and Sailors' Orphans' Home, and the Washington Orphan Asylum, besides several others, supported entirely by private subscriptions.

In matters of primary education, Washington is not behind other large cities. Its schools are excelled by none, save perhaps those of Boston, Massachusetts. But in the higher grades of learning it is sadly deficient. True, it boasts several so-called colleges, among them Georgetown College, Columbia College, and Howard University; but, in point of fact, these do not rank higher than an average New England high school.

The society of the city is very cosmopolitan. Gathered as it is not only from all parts of the country indiscriminately, but from all countries of the world, and from all grades of society, it would be strange if it were not so. It is also extremely democratic; such things as sects in this society cannot exist. While it has long been a political centre, it is rapidly growing to be a scientific and literary centre. The great number of scientific and literary experts employed by the Government in various capacities give a tone to the society; while the unexampled advantages to the litterateur, artist, and scientist, afforded by the vast libraries, museums, and works of art, are daily attracting to the national capital more and more of this class of population.

Commercially, the city is nothing. Its business relates simply to supplying the employés of the Government, who necessarily form a large part of the population.

9. *Buffalo, Cleveland, Detroit, Pittsburg, Cincinnati.*

Of the towns in the interior a few only call for special mention. In the West, amongst the chief cities are Buffalo, Cleveland, and Toledo, the first and third being great centres of the corn and cattle trade. The second is especially famous for its extensive petroleum refineries, rivalling those of Pittsburg, as well as for its lumber-yards, ironfoundries, smitheries, and shipbuilding-yards, and has one of the most frequented ports on the Great Lakes.

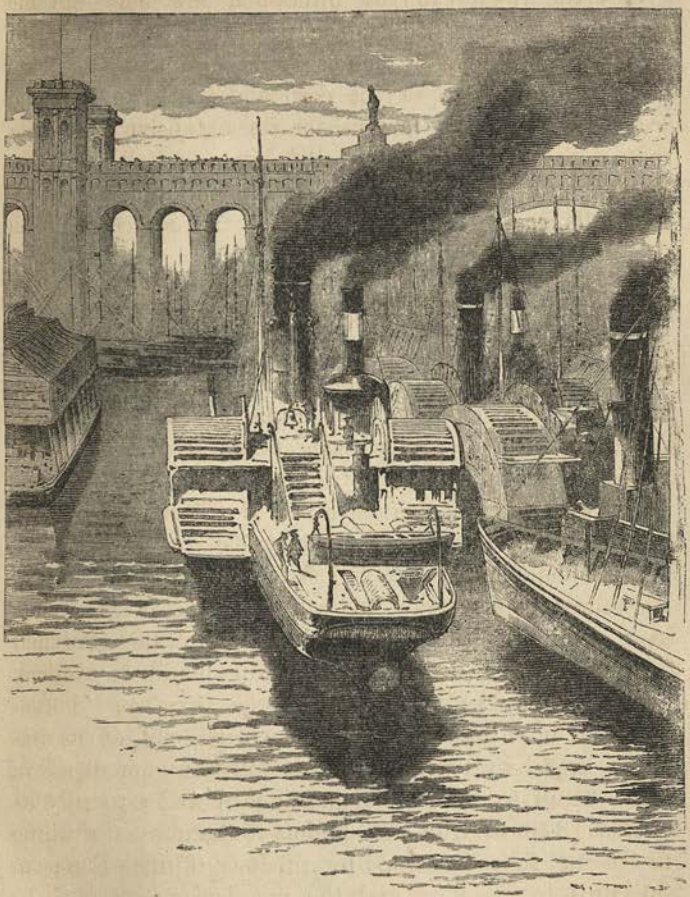
Detroit is a city of the second rank. Here are concentrated the smelting-works where the excellent copper-ores of Lake Superior are smelted, and large quantities of bacon are also cured in this place. It has not yet forgotten its French origin, many French Canadians residing there, and the French language being still used to some extent.

Mention should also be made of Pittsburg in Pennsylvania, originally the Fort Duquesne of the French, now famous for its smelting-works, petroleum-refineries, coal-mines, glass-works, and manufactories of every sort. In a word, it may be regarded as the Manchester and Birmingham of the New World. Nor should we overlook Cincinnati on the Ohio, the "Queen City," or "Porkopolis," as it is frequently called, on account of its immense trade in pork. Wine is also here produced in large quantities, its champagnes, hocks, and especially its sparkling Catawba, in the opinion of the natives, rivalling in flavour the corresponding produce of the European vineyards.

10. *St. Louis and Chicago.*

But the two great rival cities in the West are undoubtedly St. Louis on the Mississippi, in the State of

Missouri, and Chicago on Lake Michigan, in Illinois. There are few cities in America so favourably situated as



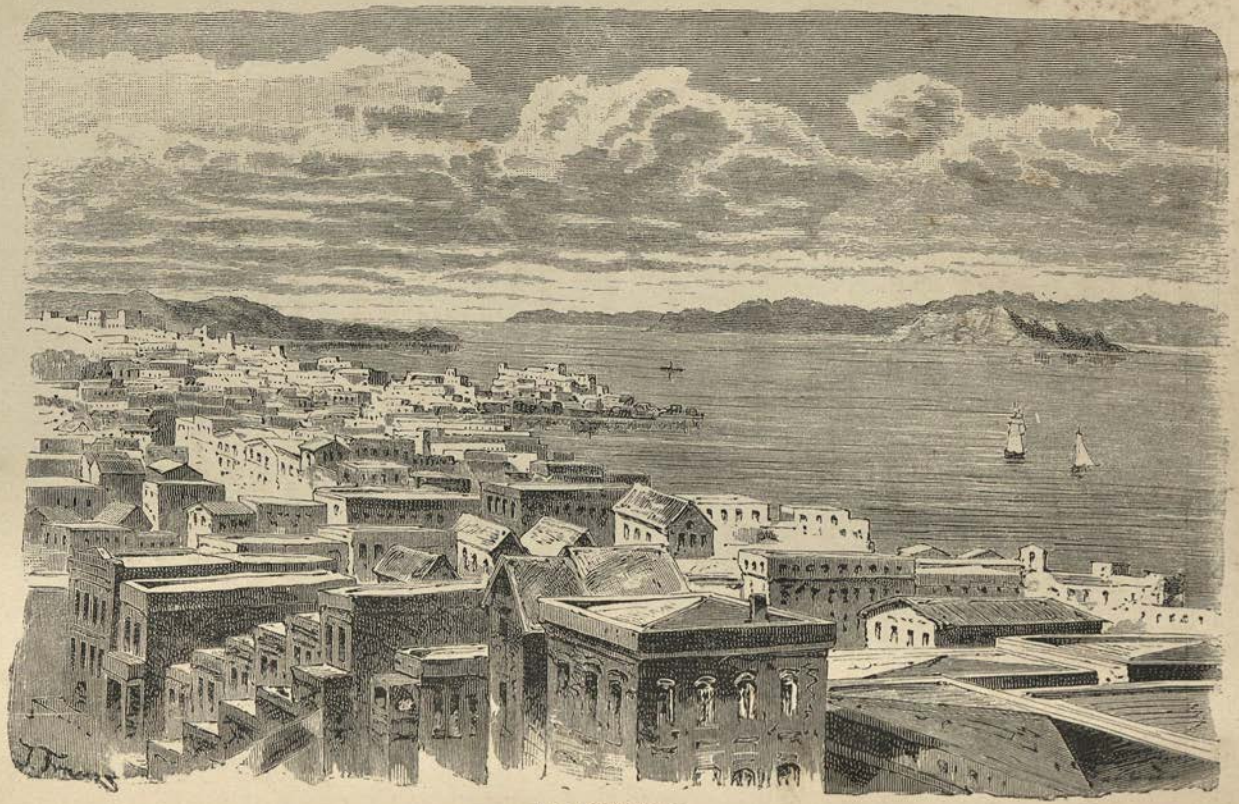
HARBOUR, ST. LOUIS.

St. Louis In the centre of the Mississippi Valley, it lies midway between the extreme western point of the great lakes and the Gulf of Mexico on the one hand and the

Atlantic seaboard and the slopes of the Rocky Mountains on the other. It is further situated in a region capable of unlimited expansion, all which advantages give it some claims to be regarded as the possible future capital of the great republic. Hence it is not surprising that the question of the transfer of the seat of government from Washington to St. Louis has already been frequently discussed.

The growth of this city has been astounding, the population increasing from 75,000 in 1850 and 160,000 in 1860 to 310,000 in 1870, thus doubling itself in each successive decade. In 1880 the number was 350,522. This rapid growth has therefore received a very decided check, but a further great development is so confidently relied upon that in all public establishments every provision is made to meet it beforehand. No city in the Union presents such a charming prospect as does St. Louis seen from the neighbourhood, washed as it is by the great river, whose mighty waters flow majestically by, and whose shores are now connected by a really gigantic bridge, high enough to allow the largest Mississippi steamers to pass freely beneath its colossal arches. Of this magnificent tubular railway bridge Professor Münch, writing in 1875, declares that it remains, so far, without a rival in the Old or the New World.

Still more rapid has been the growth of Chicago. In the decade between 1839 and 1849 its population rose from 3200 to 23,047, amounting in 1859 to 90,000, and in 1870 to 298,977. Notwithstanding the fearful fire of 1871, it increased from 304,000 in that year to 334,000 in the next, and the population, calculated by the Chamber of Commerce at 430,000 in 1873, is now (1880) 503,304. Chicago is the chief port on the great lakes, by which it is connected with the St. Lawrence and Canada, as well as through the Erie Canal with the



SAN FRANCISCO.

To face page 199.

Hudson and New York. About twelve railway lines radiate from this place, which has justly been called the daughter of New York.

To its enormous import and export trade have already been added various branches of local industries. The sights of the place may easily be seen in the course of a day, though in the midst of all this bustle and traffic one is apt to forget that he is in a new world, where nature must necessarily for a long time present greater sources of æsthetic enjoyment than the most populous of cities born but yesterday.

11. *San Francisco.*

This sketch of the more important cities of the Union would be incomplete without some reference to San Francisco, the "Naples of America." Like most of the other towns in the New World, the Californian capital is laid out in regular squares. But the straight streets here ascend such steep inclines over the sand dunes that it becomes at times impossible to follow them to the end. It often happens that after the street has been laid out and built upon, more recent improvements, by effecting deep cuttings through the crests of the ridges, have left the houses suspended like frowning bastions high above the final level of the roadway. Had the first plan been better adapted to the lay of the land than the straight lines here impracticable, a really beautiful city might have arisen on these picturesque slopes.

But notwithstanding this drawback, San Francisco still remains unquestionably the finest city in the Union. New York alone might perhaps compete with it in this respect, but any one long resident in both places, if unswayed by partial feelings, will unhesitatingly award the palm to San Francisco. It is charmingly situated on a hilly site almost completely encircled by the waters of

the Pacific. In his *Greater Britain*, Sir Charles W. Dilke speaks thus of the "Golden City," as it is now often called:—

"San Francisco is ill-placed, so far as mere building facilities are concerned. When the first houses were built in 1845 and 1846, they stood on a strip of beach surrounding the sheltered cove of Yerba Buena, and at the foot of the steep and lofty sand-hills. Dunes and cove have disappeared together; the hills have been shot bodily into the bay, and the former harbour is now the business quarter of the city. Not a street can be built without cutting down a hill or filling up a glen. Never was a great town built under heavier difficulties; but trade requires it to be exactly where it is, and there it will remain and grow. Its former rivals, Vallejo and Benicia, are grass-grown villages, in spite of their having had the advantage of a 'perfect situation.' While the spot on which the Golden City stands was still occupied by the struggling village of Yerba Buena, Francisca was a rising city, where corner lots were worth thirteen or twenty thousand dollars. When the gold rush came the village, shooting to the front, voted itself the name of its great bay, and Francisca had to change its title to Benicia, in order not to be thought a mere suburb of San Francisco. The mouth of the Columbia was once looked to as the future haven of Western America, and point of convergence of the railroad lines; but the 'centre of the universe' has not more completely removed from Independence to Fort Riley than Astoria has yielded to San Francisco the claim to be the port of the Pacific. . . . In my walks through the city I found its climate agreeable rather for work than idleness. Sauntering or lounging is as little possible as it is in London. The summer is not yet ended; and in the summer at San Francisco it is cold after eleven in the day—strangely cold for the latitude of

Athens. The fierce sun scorches up the valleys of the San Joaquin and the Sacramento in the early morning; and the heated air, rising from off the ground, leaves its place to be filled by the cold breeze from the Pacific. The Contra Costa Range is unbroken except by the single gap of the Golden Gate, and through this opening the cold winds rush in in a never-ceasing gale, spreading fan-like as soon as they have passed the narrows. Hence it is that the Golden Gate is called the 'Keyhole,' and the wind the 'Keyhole Breeze.' Up country they make it raise the water for irrigation. In winter there is a calm, and then the city is as sunny as the rest of California.

"So purely local is the bitter gale that at Benicia, ten miles from San Francisco, the mean temperature is ten degrees higher for the year, and nearly twenty for the summer. I have stood on the shore at Benicia when the thermometer was at a hundred in the shade, and seen the clouds pouring in from the Pacific and hiding San Francisco in a murky pall, while the temperature there was under 70 degrees. This fog retarded by a hundred years the discovery of San Francisco Bay. The entrance to the Golden Gate is narrow, and the mists hang there all day. Cabrillo, Drake, Viscaino sailed past it without seeing that there was a bay, and the great land-locked sea was first beheld by white men when the missionaries came upon its arms and creeks far away inland.

"The peculiarity of climate carries with it great advantages. It is never too hot, never too cold, to work—a fact which of itself secures a grand future for San Francisco. The effect upon national type is marked. At a San Franciscan ball you see English faces, not American. Even the lean Western men and hungry Yankees become plump and rosy in this temple of the winds. The high metallic ring of the New England voice is not found in San Francisco. As for old men California must have been

that fabled province of Cathay, the virtues of which were such that, whatever a man's age when he entered it, he never grew older by a day. To dogs and strangers there are drawbacks in the absence of winter: dogs are muzzled all the year round, and mosquitoes are perennial upon the coast.

"San Francisco is inhabited, as all American cities bid fair to be, by a mixed throng of men of all lands beneath the sun. New Englanders and Englishmen predominate in energy. The French and Italians are stronger here than in any other city in the States; and the brown-skinned Mexicans, who own the land, supply the market people and a small portion of the townsfolk. Australians, Polynesians, and Chilians are numerous; the Germans and Scandinavians alone are few; they prefer to go where they have already friends—to Philadelphia or Milwaukee. In this city—already a microcosm of the world—the English and American are in possession, have distanced the Irish, beaten down the Chinese by force, and are destined to physically preponderate in the cross-breed, and give the tone, political and moral, to the Pacific shore. New York is Irish, Philadelphia German, Milwaukee Norwegian, Chicago Canadian, Sault St. Marie French; but in San Francisco, where all the foreign races are strong, none is dominant, whence the singular result that California, the most mixed in population, is also the most English of the States" (ii. pp. 247-254).

CHAPTER XIII.

THE POPULATION AND ITS VARIOUS ELEMENTS.

1. *Statistics of the Native and Foreign Elements.*

APART from the Aboriginal Indians and the men of colour, whether pure negroes or half-castes, of whom we shall have to speak farther on, the white population of the United States belongs mainly to the British, or rather to the Anglo-Saxon stock. An estimate for the year 1868 distributes it in the following proportions, according to the various nationalities whence it is descended:—English, Scotch, Irish, and Welsh, 15; Germans, Scandinavians, and Dutch, 10; Spaniards and French (Latins), 5; Africans, 4; Native Indians and South Americans, 1. The census returns for 1870 gave 32,989,437 natives and 5,566,564 immigrants,—that is in the proportion of one to seven. Of the natives, both parents of 9,734,845 were foreigners, 10,521,233 were the offspring of a foreign father and an American mother, while 10,105,626 were descended from a foreign mother and an American father; strange to say, the census includes the first over again in the last two numbers. There were, then, about 16,000,000 immigrants or their children.

2. *Native Americans.*

By this term is meant those Caucasians who were born and bred on American soil, whatever their original derivation. They are found to differ widely in different

sections of the Union. This is natural, as the immigrants to different sections were of different nationalities, and were, and are, subjected to different social and climatic conditions. The idea that *one* new race is in process of formation on this continent is manifestly incorrect, not only in fact, but in theory, as all the conditions which tend to modify the human type differ extremely in different parts of the country.

New England was originally settled by Puritan English, a people who lived a hard austere life. They were honest, conscientious, and intellectual, but narrow and bigoted. A cold, bleak, damp climate and poor soil are the gifts of Dame Nature to New England, and the history of the settlers has been one of poverty and hardship. Such a history cannot fail to leave its mark upon the offspring of this people, and we find them, as a class, lean, tough, and wiry, with little development of muscle, but capable of great physical endurance. The face is narrow, with sharp features and high cheek-bones. The sockets of the eyes are deeply sunken, and are comparatively near to one another.

While the physiognomy of the New Englander has these peculiarities, his demeanour betrays a nervous, restless spirit, which contrasts strongly with the quiet and sober bearing of his English kinsman. He is always busy about something, always in a hurry. A state of inaction is almost unknown to him. The cause of this peculiar temperament, though possibly in a measure due to peculiarities of climate, is mainly owing to the fact that this has been, and is yet, a new country, where much and rapid work is required to subdue nature, reclaim and settle it; that life in it is full of change and excitement, and has not yet settled down to the monotonous existence of most European countries. As one proceeds westward to the newly-settled regions, he

finds this restless spirit greatly intensified, and in a newly-discovered mining district it amounts to a delirium.

The New Englanders, as a whole, contrast favourably with their fellow-countrymen elsewhere, by their especial attachment to the home country, by the interest they take in its moral and intellectual life, as well as by the retention of many good old English customs, especially shown in their love of agriculture, and in the construction and internal arrangement of their dwellings. Their pre-eminent mental qualities are clearly perceptible in their very features, and in the extraordinary influence exercised by them over society throughout the Union. Although not numbering more than a tenth of the whole population, yet on an average more than half of all important national undertakings are due to them, while most of the North-American writers and thinkers,—men like Franklin, Longfellow, Parker, Emerson, Hawthorne, and many others,—are New Englanders.

3. *The German Element.*

The other two main elements of the population are the result of more recent, and still active, migratory movements of the European nations westwards. These immigrants are either crowded together in the large seaports and commercial marts, and in the centres of industry and the mining districts of the east, or else follow the main line of railways through the inland States, spreading somewhat uniformly over the more thickly peopled regions of the West, while still showing a seeming preference for the neighbourhood of the great lakes and rivers. They are divided into two great classes, the Germans and the Irish.

Under the generic name German may here be conveniently included all the peoples of Teutonic blood except the Anglo-Saxons or English. It will thus comprise, besides the High and Low Germans, the Dutch,

the Flemings, the Swiss, the Russo-Germans, and the Scandinavian Danes, Swedes, and Norwegians. These have settled mainly in the north-western States of Ohio, Indiana, Illinois, Iowa, Missouri, Michigan, and Wisconsin, although Pennsylvania has drawn a large quota to its mining regions. Some sections of these States are peopled very largely with Germans, the American element being decidedly in the minority.

Most of the Germans who emigrate to America are from the labouring classes, and from them the ranks of miners, labourers in iron-work, and farmers, are largely recruited. As a class they are sober and industrious, but very clannish, preserving the associations of race for generations. Owing to the present policy of the German Government in regard to Socialism, very many of the adherents of this dangerous doctrine have sought asylums on these shores, where they have made many proselytes. This work has been aided by the industrial collapse under which the country is suffering, and will probably disappear with the revival of material interests. The German element is, however, a dangerous one in the body politic.

According to the statistical returns, there are at present 1,690,533 Germans in the United States, distributed amongst the various States as below :—

Alabama	2,482	Michigan	64,443	Vermont	370
Arkansas	1,563	Minnesota	41,364	Virginia	4,050
California	29,100	Mississippi	2,960	West Virginia	6,232
Connecticut	12,743	Missouri	113,618	Wisconsin	162,314
Delaware	1,142	Nebraska	10,954	Arizona	379
Florida	597	Nevada	2,181	Colorado	1,456
Georgia	2,761	New Hampshire	736	Dakota	563
Illinois	203,758	New Jersey	94,000	District of Columbia	4,920
Indiana	78,000	North Carolina	904	Idaho	388
Iowa	66,162	Ohio	182,897	Montana	1,233
Kansas	12,775	Oregon	1,875	New Mexico	582
Kentucky	30,318	Pennsylvania	160,146	Utah	358
Louisiana	18,933	Rhode Island	1,202	Washington	645
Maine	508	South Carolina	2,751	Wyoming	652
Maryland	47,045	Tennessee	4,539		
Massachusetts	13,072	Texas	23,985		

Of the larger cities, Cincinnati contains 31,000, St. Louis 40,000, Chicago 50,000, Philadelphia 60,000, and New York as many as 200,000 Germans. Some years ago official statistics of the immigration during the previous fifty-one years gave a grand total of 7,448,922, of which 3,826,040 were accredited to Great Britain and Ireland, and 2,350,000 to Germany, including 101,000 from Prussia. The German emigration attained its greatest proportions with 206,000 in the year 1854, after which it fell below 100,000, but rose in 1866 to 110,440, and in 1869 to 124,766, and again fell to 74,490 in 1870. Since then it has continued to decline, coming almost entirely to a standstill in 1874, the gloomy agricultural prospects at that time causing even a considerable counter-stream of migration to set in, especially towards Germany.

The deep national divorce between North and South Germany, intensified as it is by the religious element of Protestantism in the one and Catholicism in the other, is also kept alive in America, even after the political union of the people in Europe resulting from the Franco-Prussian war. But since that war the German element has begun to take a more prominent part in public affairs, at first rallying under the flag of one or the other of the great political parties, and then gradually forming an independent power with which the other conflicting elements may in future have to deal.

4. *The Irish Element.*

The third main element of the population is that of the Irish, mainly Roman Catholics. According to the last census, they number 1,858,827, and in proportion to its actual population, Ireland has contributed well-nigh ten times more to the peopling of North America than

the whole of Germany, in its widest sense. The returns show a total immigration of 2,377,391 from Ireland between May 1, 1851, and December 31, 1875. The tide of emigration rose highest in 1852, when no less than 190,322 forsook the shores of the Emerald Isle. Since then, while subject to great fluctuations, it has still steadily subsided, sinking in 1875 to no more than 51,462. By far the greater number proceeded to the United States, where they have become a sort of "social evil." Ethnically speaking, they contributed to a serious deterioration of the breed, while socially acquiring a decided predominance in the State through their compact organisation and blind obedience to their self-elected political leaders. They show a marked preference for the Atlantic States, where they form the mass of the artisans and of the menial element in the large towns. For agricultural pursuits they seem to possess little taste, not more than 138,000 altogether being devoted to the cultivation of the land. On the other hand, there are more Irishmen in New York alone than in Dublin. There they number no less than 340,000, one-third of the whole population,—through their decided majority and spirit of clanship deciding all the municipal elections in the Empire city. Their vote elects the mayor, the magistrates, and the police. Hence the political parties must everywhere make large concessions or "bids" for the Irish vote in this city.

They were especially the chief supporters of the infamous "Tammany King." They are mainly uneducated, coarse, brutal, steeped in superstition, and contribute a large part to the statistics of crime. An Irish politician disputing with an American on the importance of the Irish element in the States, began to exclaim enthusiastically, "Who built the New York City Hall? The Irish! Who built the hospital on Ward's Island? The Irish!

Who built the Gaol on Blackwells' Island? The Irish!" "And who fill its cells?" suddenly asked the American. "The Irish, of course!" replied Pat, carried away by his great zeal for the glory of his country.

5. *The Whites of the Southern States.*

In the Southern States all the recent European immigration is of but little account. Here the great mass of the white population is English, but not of the strict Puritanical type, being mostly descendants of the old Cavaliers, with perhaps here and there a dash of Huguenot blood. Here, also, there has been developed a peculiar type, distinguished especially for large physical proportions, while at the same time retaining something of the florid European complexion. Altogether the Southern type is much less sharply defined than that of New England (Becker).

The non-European elements will best be considered separately, taking first the blacks and half-castes, as decidedly the most important of all.

6. *The Negro.*

Unquestionably, the *gradual* extinction of the slave system, so injurious not only to the blacks, but still more so to the slaveholders, and to the good name of that Government which had declared that "all men are created free and equal," would have been far preferable in every respect to the catastrophic manner in which it was effected. But the action of the slave-holding States in precipitating a war upon the country rendered this measure an absolute necessity as a means of inflicting a crippling blow upon the enemy.

The blacks unquestionably, as a class, have been since the war in a worse condition physically, and per-

haps morally, than when held as cattle. Immediately upon being freed they stopped working, and, in obedience to their naturally lazy instincts, they work now only enough to earn a scanty livelihood. They flocked to the neighbourhood of cities, leaving the farms and plantations, and, driven by necessity, or kleptomania (for the negro is the true kleptomaniac), the police courts and jails were soon filled to overflowing with them. In the Southern States nearly all the petty crimes are committed by blacks. It was at one time very difficult to get men to work on the plantations, and for years a large part of them were uncultivated from this cause.

We have already seen what use they made of the ballot, which was prematurely put into their hands. It not only produced the worst form of misgovernment for a time, but since the whites obtained possession of the civil power again in the Southern States, it has entailed much suffering among the blacks, from persecution by the dominant classes.

This reaction was but a natural result of their sudden and radical change of condition, and is now being followed by a gradual and slow, but sure, improvement. Cheap reliable negro labour is now easily obtained in the country, and the plantations are again under cultivation.

Everywhere schools have been established for their instruction, and they are well attended, not only by children, but by adults, though it must be confessed that they do not make very apt pupils.

They are, of course, a very religious people, being strongly emotional in their nature, and belong chiefly either to the Methodist or Baptist denomination, which are the ones that appeal most strongly to the feelings in their worship.

These children of Ham are natural musicians, both vocal and instrumental. Fine voices are the rule rather

than the exception, though anything like musical culture is almost unknown to them.

With the political equality, the social barriers which had separated the white from the black race gave way—at least as far as the law could break them down. The Civil Rights Bill, of which Mr. Charles Sumner was the principal champion, secured to them the same rights which appertain to the whites, so that the difference in colour no longer stands in the way of the ambitious negro, to whom the presidential chair is possible. They have already had representatives in both Houses of Congress, and these representatives have been men who have not disgraced their high positions.

That the negro can be educated and brought up to the grade of good citizenship, the many examples before us abundantly prove. But it is not the work of a moment—rather that of generations.

7. *The Chinese in the States—Their Good Qualities.*

Of late years considerable numbers of Chinese have emigrated from the south of China to the Pacific States of the Union, where they find in the warm western seaboard a climate similar to that of their own country. These "celestials" undoubtedly possess a number of excellent qualities. They are not only quiet, harmless, peaceful, docile, and extremely modest in their pretensions, but are, moreover, unusually quick and skilful imitators, and withal active, industrious, and persevering in the work assigned them, even when left to themselves without any special superintendence. Although mostly small and squat, and rarely endowed with the athletic frames so common amongst the negroes, they still show great capacity for such heavy field work as requires the joint action of a large number of hands. And though they may not be

able to perform it in so short a time as an equal number of more robust whites or blacks, they will make up for this drawback by more steady and persevering labour, conscientious application, and uniform workmanship.

They will, moreover, condescend to the lowest occupations, such as scavengering, rag gathering, and the like pursuits, far too degrading for the European or American whites. But they also take readily to agricultural, mining, and railway work; while in San Francisco they aspire even to the dignity of merchants and physicians, or at least quacks. At the same time, their wants are extremely limited; and the little that they do require is mostly procured from China itself by means of the "Six Great Companies." Hence, however valuable the Chinaman is as a producer, he is next to useless as a consumer.

8. *Degraded Habits and Vices of the "Celestials."*

But their many good qualities are balanced, or more than balanced, by others of a very different stamp, that are quite sufficient to account for the ill favour in which they are everywhere held. Not only is their general standard of culture so low that they have not the remotest idea of the nature of the institutions of the country where they happen to be residing, but they live, moreover, in complete seclusion from the rest of the community, forming a caste for themselves, a State within the State. Both for the purposes of society and amusement they resort to their own gathering-places, so that their intercourse with the whites becomes restricted to matters of the most absolute necessity.

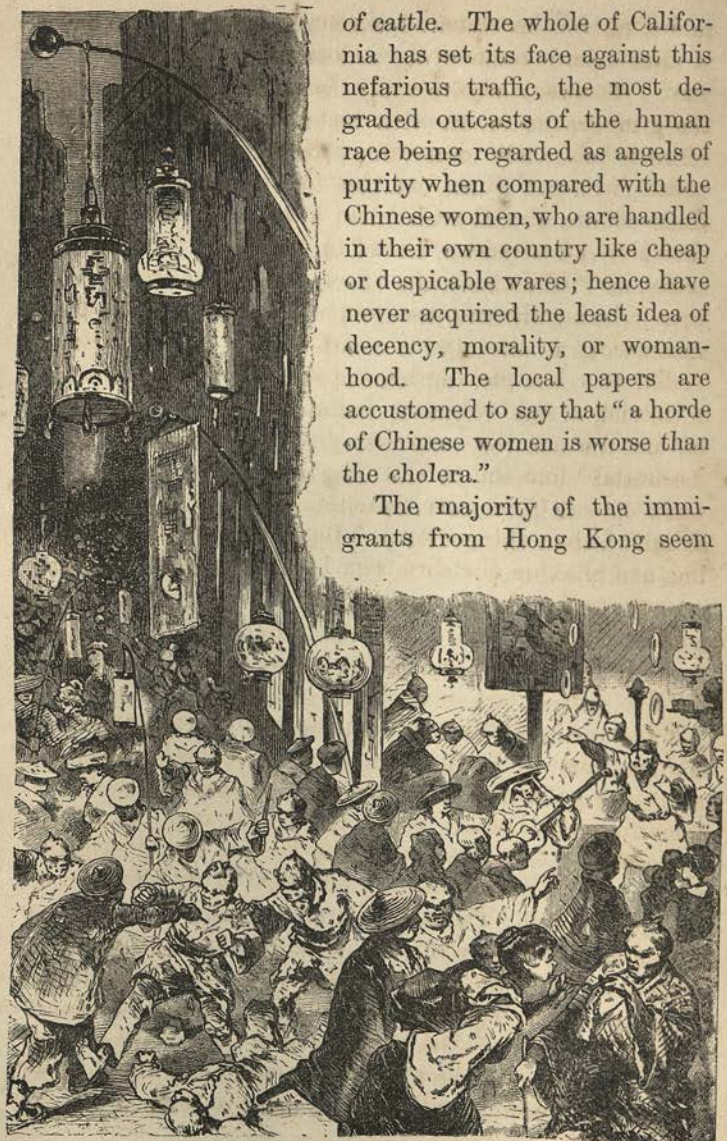
Their habits are also indescribably filthy, the dens occupied by them reeking with unsavoury odours, and swarming with vermin. The Chinaman is, moreover, a born smuggler, especially in the matter of his beloved

opium. He is by nature suspicious, and loses no chance of circumventing the white man in all their mutual dealings. He soon learns to apply his artistic skill to forging; hence enjoys no credit with his neighbour, and is compelled to pay ready money for everything. He is, at the same time, a passionate gambler, and is incapable of any sentiment of personal attachment. However long he may have served his master, he will leave him at a moment's notice, as soon as he hears that more remunerative work is to be had elsewhere, though it may amount to no more than an extra half-dollar a month.

Of the meaning, importance, and sanctity of an oath, or, in fact, of the virtue of truthfulness in any form, he has not the remotest conception. Hence he almost excels the Malay of Java in the utterly unscrupulous way in which he will produce false witnesses, or allow himself to be suborned in the courts of justice. It has been made abundantly evident that a Chinaman will unhesitatingly swear to anything required of him, in return for a few coins of trifling value. The natural consequence is, that the Chinese everywhere find it a very difficult matter to get justice, even when in the right, and this is especially the case in their disputes with the whites when the decision depends upon hard cross-swearing. In fact, their notions of right and law are altogether highly distorted.

9. *Social State of the Californian Chinese.*

Amongst the Californian Chinese there is simply no such thing as family life, owing to the extreme scarcity of women of any sort, and especially those whose reputation would bear the least inspection. The few that are found amongst them have been imported simply to supply the dens of infamy in the Chinese quarters of San Francisco. They are nothing but slaves, treated like so many heads



THE CHINESE QUARTER, SAN FRANCISCO.

of cattle. The whole of California has set its face against this nefarious traffic, the most degraded outcasts of the human race being regarded as angels of purity when compared with the Chinese women, who are handled in their own country like cheap or despicable wares; hence have never acquired the least idea of decency, morality, or womanhood. The local papers are accustomed to say that "a horde of Chinese women is worse than the cholera."

The majority of the immigrants from Hong Kong seem

to belong to the scum of society, which the authorities of that colony make every effort to get rid of in this way. This may also, perhaps, help partly to account for the great discrepancies often met with in the pictures of Chinese habits and customs as described by various impartial writers. But that the "heathen Chinee" is at times able to give the Christian himself a sharp lesson is shown by an anecdote related to Hepworth Dixon by an indignant "Christian citizen" of San Francisco. It occurred during the rainy season, when the mud lay fifteen inches deep in the streets. A Chinese, gaily dressed in violet satin, was picking his steps daintily over a plank at a crossing, a sight which so irritated a looker-on, that he advanced from the opposite direction and jostled the "celestial" into the mud. The manœuvre and the spectacle of the Chinaman floundering in the mire greatly delighted the gaping crowd. But on recovering his footing, and shaking the dirt from his satin robe, he made a curtsey to his tormentors "like a young girl," looked mildly round, and withdrew with the remark, loud enough to be heard by all: "You Christian, me heathen: goodbye."

The same writer gives the following account of the Chinese element in the Pacific States of the Union:—

"The yellow man, generally a Chinese, often a Malay, sometimes a Dyak, has been drawn into the Pacific States from Asia and from the Eastern Archipelago by the hot demand for labour, any kind of which comes to him as a boon. From digging in the mine to cooking an omelette and ironing a shirt, he is equal to everything by which dollars can be obtained. Of these yellow people there are now 60,000 in California, Utah, and Montana; they come and go, but many more of them come than go. As yet, these harmless crowds are weak and useful. Hop Chang keeps a laundry, Chi Hi goes out as cook, Cum

Thing is a maid-of-all-work. They are in no man's way, and they labour for a crust of bread; carrying the hod when Mike has run away to the diggings, and scrubbing the floor when Biddy has made some wretch the happiest of his sex. Supple and patient, these yellow men, though far from strong, are eager for any kind of work; but they prefer the employments of women to those of men, delighting in an engagement to wash clothes, to nurse babies, and to wait on guests. They make very good butlers and chambermaids. Loo Sing, a jolly old girl in pigtail, washes your shirts, starching and ironing them very neatly, except that you cannot persuade him to refrain from spitting on your cuffs and fronts. To him spitting on linen is the same as damping it with drops of water; and the habits of his life prevent him, even though you should catch him by the pigtail and rub his tiny bit of nose on the burning iron, from seeing that it is not the same to you. To-day these yellow men are 60,000 weak, in a few years they may be 600,000 strong. They will ask for votes. They will hold the balance of parties. In some districts they will make a majority—selecting the judges, forming the juries, interpreting the laws. Those yellow men are Buddhists, professing polygamy, practising infanticide. Next year is not more sure to come in its own season than a great society of Asiatics to dwell on the Pacific slopes. A Buddhist Church, fronting the Buddhist Churches in China and Ceylon, will rise in California, Oregon, and Nevada. More than all, a war of labour will commence between the races which feed on beef and the races which thrive on rice—one of those wars in which the victory is not necessarily with the strong" (*New America*, vol. ii. pp. 17-19).

10. *The Japanese in California.*

While on this subject, it may be mentioned that, besides the Chinese, a Japanese colony has also been settled in California since about the year 1860. A German named Schnell, resident for some years in Japan, came to San Francisco to establish a Japanese settlement in California on the co-operative system, the object being to introduce the cultivation of the tea and olive plants, the wax and mulberry trees, and develop the silk trade generally. Schnell procured a considerable tract of land in the county of Eldorado, and the seedlings he at once planted here have succeeded remarkably well, not excepting the tea plants, although for these the season was anything but favourable. The very next year a small crop of tea was sufficient to allow of an opinion being hazarded on the quality of the new product. Schnell has come to the conclusion that the climate of California, with its hilly grounds, is far more favourable for the growth of the tea plant than is Japan itself. The three-year-old mulberry saplings on the same occasion brought from Japan soon struck root, and the introduction of rice plantations began to be talked of in 1870. But since then no further reports have been received regarding the condition of the young Japanese colony in California.

CHAPTER XIV.

THE INDIANS.

1. *Statistics of the Settled and Nomad Tribes.*

In the last census 66,407 only of all the Indians residing in the United States Territory are accounted for. No official estimate could be made of those still living in open hostility to the Government any more than of those confined to the territory of Alaska, who have been calculated at 75,000. But according to the last report of the Commissioner of Indian Affairs, the total number of Indians in the United States is 255,938, exclusive of Alaska. This, however, can be accepted only as a tolerably correct estimate, as there is absolutely no way of arriving at the truth.

In speaking of the Indians two categories must be distinguished,—the settled and agricultural Indians, and those living on the produce of the chase. Of the first class, also, there are two divisions,—those who were originally and of their own motion settled in towns, and those who have been induced to give up their nomadic life and settle down to agricultural pursuits by the efforts of the whites.

The first of these latter divisions comprises the Pueblo and Moqui Indians, who are known as town-building Indians. Their home is in New Mexico and Arizona. They are really a semi-civilised people, and are plainly to be distinguished from the rest of the aboriginal popu-

lation of America, from whom they differ in origin, mode of life, customs, and affiliations. They are probably related, more or less closely, to the Aztecs or Toltecs of Mexico.

2. *Pueblos.*

The Pueblos constitute several tribes, with different languages. Some of them have become extinct since the occupation of the country by the Spanish, but those now existing are the Zunis, in the town of Zuni; the Toltos, in Taos, with whom are classed the people of Picuris, Sandia, and Isleta; the Tiguas in San Juan, Santa Clara, Nambé, San Ildefonso, Pojuaque, and Tesuque; the Queres in Cochite, San Domingo, San Felipe, Santa Aña, Zia, Laguna, and Acoma; and the Jemez, in the Pueblo of the same name. In the nineteen Pueblos named there are estimated to be 8400 people, the most populous being Zuni, with some 1500 souls; and the least, Pojuaque, with but thirty or forty persons.

At the time of the first Spanish conquest they were as far advanced as now, raising grain, vegetables, and cotton, and manufacturing fine blankets. Their houses are sometimes built of stone, but generally of adobe, and are usually several stories in height, each one receding from the one below, leaving a terrace or walk. The general plan is a hollow square, circle, or irregular ellipse; although in some cases they are built in a solid mass, like a pyramid, six or eight stories in height. In each pueblo there are large rooms, sometimes underground, for religious observances or councils, or for both purposes, which are called in Spanish *estufas.* The towns are sometimes built upon the summits of high terraces or *mesas,* extremely difficult of approach.

3. *Moquis.*

This tribe of semi-civilised Indians live in seven villages on the plateau between the San Juan and the Colorado Chiquito rivers, in North-eastern Arizona. Their villages are perched upon the summits of mesas, 400 to 600 feet above the surrounding level. The houses are built of stone, laid in adobe mortar, in terrace form, seldom exceeding three stories in height, and are reached only by ladders. The people have the reputation of being extremely kind-hearted and hospitable. Their pursuits are agricultural, raising maize, squashes, pumpkins, and peaches. They also have large herds of sheep and goats. The women knit, spin, and weave, making fine blankets, women's robes, and other like articles. They use no intoxicating drink; and are, men and women, industrious and virtuous. The men have adopted the usual Mexican dress, while the women wear a woven tunic, and a small blanket, fastened over the shoulders. Before marriage the hair of the women is worn in two large rosettes, one on each side of the head, and after marriage it is worn loose down the back, or rolled up on the back of the head.

By a census taken in 1877, the population of these seven towns was 1604 souls. When they first came under the jurisdiction of the United States, they were estimated to contain 8000 persons, but the ravages of smallpox in 1855 and 1857, and a famine in 1867, reduced their number enormously.

4. *The Nomadic Tribes.*

Under this head will be treated all the rest of the aboriginal population of the United States, including those who have been induced to give up their wild life and settle on reservations.

An ethnological distribution of the various tribes presents so many and such serious difficulties that no thoroughly satisfactory scheme has hitherto been proposed. In the Appendix will be found a comprehensive scheme of classification, based mainly on languages, which is believed to be in the main correct. For details connected with the history and former range of these tribes the reader is referred to this Appendix.

5. *Characteristic Traits of the Indian.*

The Indian is a savage, with all that the name implies. He is cruel and treacherous in the extreme, and naturally so, as war and hunting are almost his sole occupations. He has the reputation of being extremely taciturn and reserved, and so he is when among the whites, but when at home he is quite the reverse. He is possessed of immense power of enduring fatigue and exposure, and no amount of physical pain will draw from him a groan. He has the utmost cunning and perseverance, qualities which his occupations develop to a remarkable degree. Possessed of much animal courage, so as to love war for its own sake, he has little of that higher mental courage which is governed by the will, and which enables a man to brave death without flinching. In war he seldom engages in a pitched battle; ambuscades and surprises, where he takes little or no risk, are his methods of waging war. He fights behind trees and rocks; he creeps up, and stabs you in the back, or "jumps" your camp at midnight, when all are asleep. He is a capital horseman; not unfrequently one sees boys of eight or ten riding, without saddle or bridle, save a bit of raw hide, their half-broken ponies on the racecourse. Horses are his wealth, and many Indians are very wealthy. They are used in war, in hunting, and in travelling, to carry not only the Indian and his family,

but all his household goods, and a moving Indian village makes a large cavalcade.

At home, the Indian stoops to none of the menial duties connected with housekeeping. His squaw must take the loads off the pack-ponies, put up the lodge, bring wood and water, and cook, while her lord and master reclines on the ground and smokes. The squaws are, like women in most barbarous tribes, little better than slaves.

The practice of scalping, which is almost peculiar to Indians, is not, as some suppose, a method of torturing their victims, as is shown at once by the fact that it is performed only on those supposed to be dead. The scalp —that is, the skin of the top of the head, with the hair —is taken simply to prove the killing, as the hunter is required to show the ears of the wolf in order to claim the bounty.

The following spicy description of the Indian is taken from the Earl of Dunraven's book, entitled *The Great Divide*:—

"The sole end and object of his existence, the point on which all his thoughts and energies are concentrated, is to appear formidable to his enemies, and attractive to the women. If he can scare his foes by the hideousness of his war-paint and the ferocity of his appearance, he is delighted, because he may, perhaps without risk to himself, shoot one of them in the back while running away; and having done so, he and his friends would scalp the body, and kick it, and dance around it, and stamp upon it, and abuse it, and stick it full of knives and arrows, and have a 'gay old time generally,' and then go home and be afraid of the dead man's ghost. At any rate, he would argue that, even if he killed no one, he would not be killed himself, which would be a highly satisfactory reflection to his selfish mind. And if he sees that the bright vermilion

partings of his hair, and the carefully designed and artfully painted stripes and patches on his face and chest, are making an impression; if shy glances of approval note the swing of his gay blanket and the style of his leggings, and if soft eyes brighten at the sight of his shell earrings, and the silver plates in his back hair, he is also delighted, because — well, for the same reason anybody else would be.

"In short, he is the greatest coxcomb on the face of the earth, not to be surpassed even in London for inordinate vanity, stupendous egotism, and love of self. His features may not be strictly classical, according to our standard of beauty. His cheek-bones might be considered somewhat too prominent, and his paint certainly is inadmissible with us; but, to do him justice, I must allow that he is not a bad-looking fellow in his way. Take, as an example, a young warrior of the Bannacks whom I saw riding through a street in Virginia city from their camp in the neighbourhood. Smooth and easy as a hawk's flight he sweeps along, sitting his foam-flecked mustang with the yielding gracefulness of a willow bending to the breeze; swaying his lithe body with every bound of the animal beneath him. Before him, across the pommel of his saddle, he bears his rifle in embroidered elk-skin cover, adorned with long fringes, which, mingling with the horse's mane, and the tags and tassels of his gay leggings, spread out behind him on either side. His long black hair, plaited and tied with knots of scarlet ribbon, streams out in the wind, and, uniting with the horse's tail, seems almost to touch the dust.

"Slung across his back are the lion-skin quiver and bow; by his side hangs a revolver, silver-mounted, and shining in the sun. With the toes of his beaded moccasins he touches the loops that serve him for stirrups; his left hand lightly holds the bridle; and from his right

wrist hangs by a thong his buckhorn-handled quirt or whip. As he gallops down the street, all his gay trappings fly out in disorder behind him; and when, with a pull at the cruel Spanish bit, he steadies into a walk, the folds of his scarlet blanket settle down, and hang gracefully from his shoulders, and he passes, an embodiment of savage life, full of wild beauty and bright colour, and no doubt attractive to the female eye; glancing with supreme and undisguised contempt upon the plug hat, black store coat, and pants of some newly-arrived representative of civilisation."

6. *Are the Indians dying out?*

It has long been accepted as a self-evident proposition that the red race was rapidly disappearing before the advancing strides of civilisation; that, in the struggle for existence on this continent, barbarism is giving way, not so much by the advance of culture as by want of vitality of the lower race; and this example has been used to point many a sermon on the influence of civilised on barbaric races. But lately it has been boldly stated—and the idea has found many and able supporters—that the Indians are not dying out, but that they are holding their own,—yes, even increasing in number. If this be true, then the question immediately recurs with redoubled force, Can the Indian be civilised and made a valuable member of society? and in seeking an answer to this question, it is necessary first to examine the policy of the United States towards this race, and its probable influence upon the red man, in the way of civilising him, in order properly to weigh the results thus far accomplished. It may and should, however, be premised that the word policy in this connection is misleading, as the United States have never had any settled course of treatment of the Indians. The history of

our whole intercourse with them has been simply that of a series of makeshifts, each to suit a separate emergency. However, all these makeshifts have one feature in common. They recognise the tribes as sovereignties, and treat with them as such. In the early colonial days this stand was perfectly consistent; but now, when the United States claim possession of the whole country, the absurdity of its position, in treating as with a foreign power a people who dwell within and subpossess its own land, is apparent enough. They make treaties with them, effect offensive and defensive alliances, purchase land from them (and then fail to pay them the purchase money in many cases), then, suddenly forgetting that they are foreign powers, they imprison them on reservations. On one pretext or another, in payment for land, or for *the purchase of peace*, the Government feeds and clothes nearly all the tribes which will accept donations of food and clothing; and as the Indian is at least no more inclined to work for a living than the average white man, most of the tribes have availed themselves of the munificence of the Government. And not only does "Uncle Sam" supply them with food and raiment, but with the best of breech-loading rifles and fixed ammunition, which are, in very many cases, put to use by our red brother in depopulating the border settlements and in resisting the army. This policy of supplying the Indian with all necessaries of life is what is known as the "*peace policy.*" It is a beautiful policy. Let us see how it works. The average Indian immediately jumps to the very rational conclusion that the Government is afraid of him, or it would not purchase a peace, and he is very apt to act accordingly. If things are not to his mind—if provisions, blankets, or ammunition are not forthcoming when and in such quantities as he wishes—he dons the war-paint, and a disastrous war is the result. The upshot

of the war probably is, that he gets what he fought for, and he is confirmed in his belief that to get what he wants he has only to demand it under threat of war.

The theory is, that the Indian, kept quiet on reservations, and supported there, may be in time educated to civilised pursuits. But it is a pertinent question whether, under such circumstances, the average white would labour to support himself. If all his wants were supplied, what incentive would there be to labour? And if, under such circumstances, the white man would prefer a life of inglorious ease, how much less would the red man be disposed to exertion,—the noble red man who regards all manual labour as degrading, and as worthy only of squaws. Under such circumstances, it is strange that any success whatever has attended the project of civilising the Indians, and it would seem to be rather in spite of this system than in accordance with it that any considerable portion of this people have adopted civilised ways. Yet such is the case, and it shows that they can be civilised, and that if managed properly they might be made into good citizens with comparative rapidity.

In Indian Territory, where many of the tribes have been congregated on reservations, there has been considerable advance towards civilisation. The Cherokee, Choctaw, Seminole, Creek, and Chickasaw tribes, numbering altogether about 56,000, have adopted civilised dress, live in houses, cultivate the land, and support large schools. The Pawnees, Pottawotamies, and other tribes, contain a large percentage who have adopted civilisation. The Omahas, on a reservation in Nebraska, have of late made rapid strides in the same direction. In Arizona, the Pimo, Mojave, and Maricopa Indians are all engaged in the cultivation of the soil. The Sioux of Dakota, heretofore regarded as one of the most untamable of tribes, are beginning their career as farmers and stock-

raisers. The Navajoes of New Mexico have long cultivated the soil, having learned this art from their semi-civilised neighbours, the Moquis. Many other tribes, not mentioned here, have made more or less advance towards self-support, so that it can no longer be said that the Indian is untamable.

There are, however, several tribes which as yet have not shown the influence of civilisation. Among them may be mentioned prominently the Apaches of Arizona, the Utes of Colorado, the Bannacks of Idaho, the Crows and Blackfeet of Montana, and several bands of the great Sioux nation, with their allies, the Cheyennes and Arapahoes. The Comanches of Texas, too, continue to be the same lawless, plundering, wild tribe that they have ever been.

7. *The Predatory Tribes of the West.*

A few little forts occupied by slight garrisons in those immense plains rolling from the Missouri westwards to the Rocky Mountains, and beyond them to the snowy Sierra, are totally insufficient to keep the redskin in check, and protect the main highways of traffic leading to the Pacific sea-board. On these highways, stretching right across the continent, there occur those repeated acts of violence which so greatly impede the safe transit of goods and passengers bound westward. The Indians roaming over these regions are amply furnished with provisions, ponies, buffalo meat, and furs. They follow the herds of bisons grazing on the prairies in summer northwards to the lands between the White River and Yellowstone, in winter southwards to the Republican Fork and Arkansas Rivers, thus crossing the vast uplands and the great overland routes. It is when they come upon these post-roads that they fall upon emigrants, traders, trappers, and squatters, firing the

ranches, stealing cattle, mules, and horses, and even laying waste the stage stations. These Indians belong mostly to the united hordes of the Sioux, Kiowas, Cheyennes, Arapahoes, Crows, and Comanches,—cruel, treacherous, and savage marauders, that have ever been hostile to the pale-faces, and may continue to be so till the last of their race has breathed his last breath.

Since the conclusion of the civil war, these red-skins have become more formidable than ever, and especially when some few years ago they went on the war-path and committed many nameless horrors without any provocation on the part of the whites, brutally murdering whole families, falling upon emigrant parties, and repeatedly plundering and destroying the United States mails.

"Peace Commissioners," says Sir Charles W. Dilke, "are yearly sent from Washington to treat with hostile tribes upon the plains. The Indians invariably continue to fight and rob till winter is at hand; but when the snow appears, they send in runners to announce that they are prepared to make submission. The Commissioners appoint a place, and the tribe, their relations, allies, and friends come down thousands strong, and enter upon debates which are purposely prolonged till spring. All this time the Indians are kept in food and drink; whisky even is illegally provided them, with the cognisance of the authorities, under the name of 'hatchets.' Blankets, and, it is said, powder and revolvers, are supplied to them as necessary to their existence on the plains; but when the first of the spring flowers begin to peep up through the snow on the prairies, they take their leave, and in a few weeks are out again upon the war-path, plundering and scalping" (*Greater Britain*, vol. i. p. 129).

Quite recently, however, several thousand Sioux and other fierce marauders are reported to have given

in their submission to the United States Government. Others seem to have crossed the border, and

EMIGRANTS ATTACKED BY INDIANS.

will, doubtless, be taken care of by the authorities in the Dominion of Canada.

8. *Indian Territory.*

In the year 1825 Congress passed a measure in virtue of which all the tribes still remaining on the east of the Mississippi were to be gradually driven beyond the western border of the States, and induced to settle permanently in the present Indian Territory and north of it, the maintenance of the various treaties concluded to this effect being at the same time intrusted to special agents and commissioners.

The Indians yielded, some of them willingly, others through compulsion, the action of the Government in some instances resulting in sanguinary conflicts. A fresh measure was passed on June 30, 1851, creating a special Indian Office under a "Commissioner of the Indian Affairs," with four superintendents for the Northern, Central, Southern, and Minnesota Superintendencies, as they were named. In 1867 yet another commission was appointed by Congress, and the President for the management of the Indian affairs. Its chief object was to make choice of a district hitherto unoccupied by the whites, and remote from any of the various railway lines, but large enough to accommodate all the tribes of the Far West. This region was to remain for ever their exclusive possession, accessible to the Government officials, but to no other whites without their permission. For the first few years the tribes, as they come in, are to be there supported at the cost of the States, and the Commission is instructed to use every means to induce them to settle willingly there, and to encourage a taste for agriculture and other peaceful pursuits among them, and otherwise assist them in every possible way by supplying them with spinning wheels, machinery, agricultural implements, and the like. The question that presented itself before all others was, whether the tribes could live peacefully together,—whether

it would be possible to obviate intestine wars, or prevent depredations between them and their white neighbours, which could not fail to lead to reprisals. Notwithstanding these forebodings the project was carried out, and according to more recent reports the Indians are busily engaged in organising their internal affairs, so that the best hopes are entertained by many that the scheme may be attended with favourable results.

9. *Half-Breeds.*

It seems as if the actual European element, wherever it has fused with the Indian, assumes the ascendant. At least the results of these alliances are very different in the west and south, where Spanish blood mostly prevails, from those in the north and east, settled chiefly by Anglo-Saxon and other Teuton races.

From time immemorial the practice of selling their squaws was universal amongst the Indians, and the "Conquistadors" soon accommodated themselves to the custom, only as a rule preferring stealing to bartering. The union of white and red skins produced the Mestigoes, few of whom have got as far in their education as reading and writing. Scarcely one in ten can boast of legitimate birth, the whites scorning to contract lawful alliances with their squaws. What little knowledge has penetrated their brains is completely warped by superstition. In the consciousness of being neither white nor red, and of having no place in the Indian tribes, they despise the race of their mother as profoundly as they hate and detest that of the father. In them are intensified the vices of both races—the pride and cruelty of their Spanish fathers, the indolence and wantonness of their Indian mothers.

The northern half-breeds differ very much among themselves in their characteristics, depending upon the

nationalities of their parents. The French half-breeds are indolent, gay, and careless, resembling in many respects the Spanish half-breeds just referred to, and, like them, though in less degree, showing a want of vitality. The English and Scotch half-breeds are, on the contrary, hard-working and industrious, of good disposition, and show a vitality which predicts for them a perpetuation of the race.

But this mixture of white and Indian blood is very limited in the United States; it forms an element of population of no importance whatever. Half-breeds are very rarely seen. In Manitoba and other parts of Canada they are found in some abundance.

10. *The Unwritten History of America.*

Though the written history of this continent goes back into the past but a very few centuries, its unwritten history, as expressed to us to-day by the monuments of a people who have long since disappeared, carries our knowledge back many thousands, perhaps millions of years. People after people have lived and died here and have left no trace behind, other than their mounds, burial-places, and such signs. We find traces of ancient inhabitants in almost all parts of the country.

11. *The Mound-Builders.*

The so-called Mound-Builders formerly occupied the whole of the Mississippi Valley, the coast of the Gulf of Mexico, and the region of the Great Lakes. Their works consist mainly of tumuli symmetrically raised, and often enclosed in mathematical figures, such as the square, the octagon or circle, with long lines of circumvallation; of pits in the solid rock, and rubbish heaps formed in the prosecution of their mining operations; and of a variety

of tools and utensils, wrought in stone or copper, or moulded in clay. While the character of these structures, as traced over wide areas, differs in minor particulars, still there is a general uniformity which shows them all to be the work of a single people.

They are usually found overgrown by forests, and in the living and decaying vegetation is found the record of their disuse for at least a thousand years. The people who built them were evidently a settled people, very different from the wild tribes who inhabited the country when the whites made their appearance. These people obtained copper from the mines at Lake Superior, lead from mines near Lexington, Kentucky, and oil from Canada and Pennsylvania.

Their remains are found spread over a vast extent of country. At the sources of the Alleghany River, in Western New York, and in nearly all the Mississippi Valley States, their remains are found. They exist far up the Missouri River; they line the shores of the Gulf of Mexico from Texas to Florida, thence into Georgia, Alabama, and South Carolina. Many of their works are evidently for defence or for watch-towers; others, and by far the greater number, as burial-places, and others as temples or places of sacrifice.

The northernmost traces of this people, so far as observed, are at Isle Royale and the shores of Lake Superior. They do not appear to have resided permanently so far north, but only to have resorted there for the purpose of mining copper.

The mounds of Wisconsin differ widely from those found in other parts of the country, yet not so as to imply a different origin. These differences consist in the fact that instead of being circular, pyramidal, or following any other simple geometrical figure, the ground-plans consist of rude imitations of animals, characteristic of the region,

as the buffalo, bear, wolf, lizard, turtle, etc. etc. These animal mounds attain no great elevation, being raised above the surrounding prairie but one to six feet. Their surface dimensions are, in some cases, enormous. The "Turtle" mound at Waukesha has a total length of upwards of 300 feet; a man-like figure has a length of 214 feet; while one representing a night-hawk has a spread of wings of 240 feet.

The site of St. Louis, Missouri, was so thickly studded with mounds as to give it the name of the "Mound City." On the east side of the Mississippi River there is a vast collection of these works, probably nearly 200, of a great variety of forms. Between Alton and East St. Louis there were about sixty such structures, including the celebrated one known as the Cakokia Mound, the greatest in the country. Unfortunately, the march of modern improvement decreed its destruction, and it was swept away. It had the form of a parallelogram with sides, which, at its base, were respectively 500 and 700 feet in length, with a height of 90 feet. On the south-west there was a terrace 160 by 300 feet, which was reached by a graded way, and the summit was truncated, affording a platform 200 by 450 feet. From this platform rose a mound 10 feet high, which, on exploration, yielded human bones, funeral vases, and various implements of stone. It is probable that upon this platform was reared a capacious temple within whose walls the high priests, gathered from different quarters at stated seasons, celebrated their mystic rites, whilst the swarming multitude below looked up with mute adoration.

The entire area occupied by this mound comprised about 6 acres, and in close proximity were four elevated platforms, varying from 250 to 300 feet in diameter. These subordinate mounds were rich in relics (Foster's *Prehistoric Races of the United States*).

12. *Ruins in the South-Western Territories.*

In the territories bordering upon the Colorado drainage system are found ruins and other remains of a people evidently more or less distinct from the mound builders, and, probably, much more closely related to the Aztecs of Mexico. All over Arizona, the western half of New Mexico, the south-western portion of Colorado, the southern part of Utah and Nevada, with the south-eastern portion of California, are found the ruins of structures raised by this people. They resemble in many important particulars the towns and houses of the Moquis and Pueblo Indians of the present day which are described elsewhere in this volume, and are, probably, the last remnants of a once great race which covered this region at one time with a dense population.

These ruins, in their locations and characters, serve to sketch in rough outline the history of this people, their peaceful, quiet, pastoral, and agricultural lives; then the rude onslaught upon them by the barbarous tribes from the north, who drove them from their indefensible agricultural towns, first, to take shelter upon the summits of high *mesas*, and then, as they became weaker and less able to cope with their formidable enemies, to the clefts and crannies of the rocks, to the most inaccessible places which Nature had provided. So we can easily distinguish two entirely different classes of structures,—first, the agricultural settlements; and second, those used as fortresses or retreats in time of war.

Those of the first class were built in the fertile river bottoms, close to water and arable land. The houses were mainly communal, several stories high, similar to the Pueblos of the present day. They were made of stone, laid in more or less regular courses in mortar, or of adobe (sun-dried brick). In their ground-plan these communal

houses are rectangular, circular, or elliptical, or, more rarely, of irregular form. They are usually built around, or nearly around, a rectangular or circular court, into which the houses open; while on the outside the structure presents a blank wall, broken only by small apertures which served as windows.

In every town has been found at least one *estufa*, or sweat-house, as it is called, for the sake of a name. This building or room is rectangular or circular, and much more commonly the latter. In some cases, however, it is an underground apartment. However built, it is always with very great care, and oftentimes with a view to architectural effect. It is usually the most pretentious building in the settlement. A very common form is that of a tower, usually with a double wall, the annular space between the two walls being subdivided into rooms. One of these having a triple wall has been found. It is probable that this building was used as a place of worship, or was in some way connected with their religion. It may also have been used as the council-house, where the grave affairs of State were discussed.

At a locality in South-western Colorado, known as Aztec Spring, is situated one of the largest of these towns. The mass of ruins—for the town is in a very ruinous state—cover an area of about 480,000 square feet, and is about three to four feet in depth, making 1,500,000 cubic feet of masonry. The stone used is from a cliff fully a mile away.

At Ojos Calientes, New Mexico, are the ruins of another large town. It is placed upon a high terrace near Caliente Creek. It was built chiefly of adobe, and consisted of rows of rooms built around central courts.

On the Rios San Juan, Chaco, and De Chelle are found a number of other towns, more or less similar.

The second class of structures, those built mainly for

purposes of defence, are in general in a much better state of preservation, owing in part to their more sheltered position, but mainly, undoubtedly, to the fact that they are of a somewhat more recent date, as indicating a later chapter in the history of this people. Some of them, and perhaps the more elaborate structures, are built upon the summits of almost inaccessible *mesas*, as are the Moquis towns of the present day. Here are found round towers of considerable height, serving not only as fortresses but as watch-towers. But the cave-dwellings, as they are called, are by far the more numerous and interesting. This country, as was stated in the geographical description, is very arid. There are but few streams, and most of these traverse the country deep down below the surface in cañons, with rocky precipitous walls. Different strata in these cañon-walls have been eroded in different degrees, so that one finds horizontal caves in the walls, where one of the horizontal beds has weathered back a few feet farther than the harder beds above and below it. In many cases where these caves have occurred part way up a cliff, these people—sore beset by their enemies—have built places of refuge, secure from attack from above by reason of the overhanging cliff, and nearly so from below, as the occupants had to depend upon ladders or steps cut in the nearly perpendicular face of the rock. Travelling down the cañon of the Rio Mancos in South-western Colorado, one sees everywhere on the walls which encompass him on either hand these structures, like swallows' nests, in the clefts and crannies of the rocks. In some cases there are quite large groups of houses, well built, of stone, even two stories in height. In others, a simple wall has been thrown up across the front of a crevice.

Other traces of this ancient people are not wanting. Great areas,—hundreds of square miles, indeed,—are so thickly strewn with fragments of pottery that one may

ride for days, and at every step his horse's hoofs will strike them. Few whole vessels have been found in the ruins. They have been thoroughly explored by the Indians, who have taken almost everything of value to them. The pottery resembles very closely, in material and in the designs painted upon it, that of the Moquis and Pueblo people of the present, but in quality it is superior to the latter. Again, in many localities, arrowheads of chalcedony and obsidian have been found in abundance, indicating the scenes of many a bloody conflict.

As to the age of these ruins little is known. It is certain that they date back several centuries, undoubtedly before the first Spanish conquest, and a few facts point to a very great antiquity. That they may have been a colony of the Aztecs, founded by them in their southward migration to the table-lands of Mexico, is not improbable. But few facts are known on which to base a theory.

CHAPTER XV.

SOCIAL RELATIONS.

1. *Classes of Society.*

WHILE there is, in the United States, no such thing as nominal rank, or an aristocratic class, still Society, here as everywhere else, has arranged itself in classes of higher and lower grades, depending here not on titles of nobility, but on wealth, position, education, etc. The lines separating these classes, however, are not hard and fast, but are easily broken down. There is also a self-made aristocracy of birth, which, of all the classes, is the most exclusive. Such are the descendants of the New England Pilgrims, who comprise the "blue bloods" of Massachusetts; the descendants of the early Dutch settlers of New York, those of the Virginia cavaliers, etc. It is an old saying that in Boston, the literary centre of the Union, the criterion of the best society is brains; in New York, the commercial metropolis, it is money; while in Philadelphia it is "family." In the new cities of the West, money rather than brains buys an entrance into Society.

The young of the different sexes are allowed much more freedom of intercourse than in European countries, particularly those of the Continent. Be it day or evening, no duenna mars their enjoyment of one another's presence and conversation. As a result of this freedom there is much less crime, and fewer unfortunates; while

American girls acquire greater freedom and self-dependence. In short, they learn to take care of themselves. Marriages are much more frequently contracted from love, and less *pour convenance,* than on the Continent. The young man ordinarily first pays his addresses to his inamorata, and her consent having been gained, he has secured a powerful ally in his subsequent suit with the parents.

American women have not, as a class, the robust physique of their English cousins. They are more delicate in face and form. Their normal condition, however, is by no means that of ill health, as some ill-informed writers would have the world believe.

While in this country woman is regarded as the equal and complement of man, there is a class of the sex who, not recognising the fundamental differences between the sexes, wish to put woman in man's place, wish to give her a direct share in the government, an opening into all professions and trades. This subject of "Woman's Rights" is kept in a continual state of agitation by a few leading female minds, but little or no progress has yet been made in the direction which they desire.

In the new and sparsely-settled territory of Wyoming the experiment of giving the ballot to woman has been tried, but with very indifferent success. It was soon found that the better class of women refrained from taking any part in the elections, leaving their sex to be represented only by the scum of the population, the prostitutes and other bad characters.

2. *Public Instruction—The Schools.*

Next to religion, the educational standard is one of the best tests of national culture. The state of education in America, with all its undoubtedly admirable fea-

tures, still betrays several shortcomings. Foremost among its better features must be reckoned its system of free schools, and their princely endowments. In no other country are the public schools so handsomely endowed, or public instruction so freely and universally diffused. No sooner does a new State spring up in the wilderness than a central plot of 6 square miles is set apart in every township of 36 square miles for the school fund. Every State and every Territory, when surveyed, is parcelled out into townships of this size; and in each township, besides the above-mentioned central plot, the 36th allotment, making altogether 12 square miles, is set apart by special act of Congress for the same purpose. In this way the educational establishments of the country already possess a landed estate larger than the total area of the British Isles. This liberality of the administration rests on the principle that a Republican form of Government must find its chief mainstay in the education and enlightenment of the people.

The yearly expenditure for public instruction is said to amount to no less than £18,000,000, a portion of which is voted by the Central Government. But by far the largest part is raised by the educational tax freely imposed upon themselves by the citizens in proportion to their means, and to which every one willingly contributes his mite. Thus there was appropriated the sum of £2,301,530 for educational purposes in the year 1873. The schools of every description in the towns show, by their number, size, and excellent arrangements, how carefully the instruction of the people is attended to. In the large cities there is never wanting a public library, founded either by some private benefactor or by the corporation, but universally accessible to all.

The instruction imparted in the schools comprises all the subjects taught in the German normal and "real"

schools and gymnasiums. From the lowest class, where the primer is the only text-book, the pupil passes on step by step to the grammar school and the high school, in both of which the curriculum embraces the classics, history, zoology, literature, geometry, algebra, chemistry, and the physical sciences generally. In all these subjects the girls take part very frequently in common with the boys, though on this point there are no definite rules or prescriptions. Each community adopts whatever course seems best, the general tendency, however, being towards mixed education.

3. *Defects of the System.*

The shortcomings of the system have reference principally to the method of teaching. Until within a few years the almost universal method of teaching was by the method of "cramming," *i.e.* learning by heart from the text-book, a method by which the mind was overloaded with undigested facts, while its development was entirely neglected. While this method is still in use largely in the sparsely settled portions of the country, it is entirely superseded in the cities by more rational methods.

4. *Colleges and Universities.*

The highest of the public schools, the high schools, or academies, as they are called, fit young men and women for college.

Many of the colleges and universities are deficient in thorough scientific instruction. Until within a few years most of them had no provision for teaching these branches, while they were almost wholly devoted to languages, mathematics, theology, etc. A cause for this is the fact that very many, probably most, of the American colleges

were founded and are now maintained by religious sects, many of which are very narrow and bigoted. The larger and older of the universities, as Harvard and Yale, have long ago broken away from sectarianism, and, as one result, are now able to offer general and special instruction in science of a very high grade. Several of the youngest colleges, too, like Cornell, are entirely free from the pernicious and narrowing influence of sectarianism.

With most of the larger universities are connected professional schools, as at Harvard, where, in addition to the college proper, or "undergraduate department," there are two schools of theology, one each of medicine, of dentistry, of law, and engineering, besides the Agassiz Museum of Natural History, the Observatory, etc.

Besides the polytechnic and mining schools connected with the universities, there are several other excellent schools of these sorts. Among them may be mentioned the Rensellaer Polytechnic Institute at Troy, New York; the Steven's Institute at Hoboken, New Jersey; and many others.

Nor is the General Government backward in recognising the claims of science. For many years it has supported a Coast Survey which, in accuracy and detail of work, has not its superior in the globe; a survey of the north-western lakes; and very extensive explorations and surveys of the territories of the West. It has liberally fostered Arctic explorations. It supports, at an annual expense of fully half a million of dollars, a meteorological bureau. The Naval Observatory at Washington is supported by the Government, and, to further the interests of astronomical science, it has defrayed the expenses of many expeditions to observe solar eclipses and the late transit of Venus.

The Smithsonian Institution and National Museum at Washington, which is supported in part by the bequest

of Mr. Smithson, its founder, and in part by the Government, contains a very large museum, mainly illustrative of natural history and ethnology.

Congress has recently appropriated $250,000 for the erection of additional buildings for the magnificent collections of this museum.

In institutions for instruction in art this country is not as highly favoured. In this respect it is yet in its infancy. There are, however, schools for instruction in art in Boston, Massachusetts, New York, New Haven, Connecticut, in connection with Yale College, in Philadelphia, and several other places. The growth of this branch of education is very rapid at present.

The following description of Cornell University in Ithaca, New York, one of the youngest of American colleges, is given as illustrating the best type of American institutions of learning.

Among the founders of chairs are represented Quakers, Methodists, Congregationalists, Episcopalians, and Free-thinkers of all grades and degrees, while even the Israelites have contributed £4100 to establish a professorship of Hebrew and Oriental History and Literature, showing that this institution is not affected by any sectarian prejudices.

According to the plans of Mr. Cornell and the other founders, the students are required to provide for their own support and instruction by manual labour, at least so far as they may be unable otherwise to do so out of their private resources. The students thus working simultaneously with head and hand receive an allotment of 300 acres, the produce of which goes to supply the academical refectory. Here corn, vegetables, and fruits of all sorts are grown; while the live-stock yield flesh, milk, butter, and cheese. In a factory furnished with a steam engine of 25 horse-power, the students learn to

make their own tools, and structures are now in course of erection where they will be able to learn the building trade, while, at the same time, getting an opportunity of laying out and keeping in good order highways and gardens. For their labour, which is directed by skilled trainers and professors, they are paid according to the current rate of wages.

The great aim of rendering work as attractive, instructive, and invigorating as possible, is never for a moment lost sight of. The capital invested by Mr. Cornell is amply sufficient, besides this bodily training, to procure for the students every means of the highest intellectual development.

The founder's object has been that any one earnestly desirous of securing a thorough education shall find it easy to gratify his wish in Cornell University.

5. *Sectarian Spirit of the Private Scholastic Foundations.*

The sectarian spirit of all churches, in dealing with their educational institutions, necessarily tends to crush free inquiry and scientific culture. *Orthodox geology* must be taught, or none at all. According to the census of 1870, as many as 360 so-called universities and colleges are still under the control of these sects, many of which hold in leading-strings and enervate the most effective teaching of even really learned masters. Hence, few of these institutions take a really high place among scholastic establishments, most of them breathing a narrow sectarian spirit.

CHAPTER XVI.

RELIGION.

1. *The Christian Religion.*

ENTIRE freedom in all questions of religious faith is established by the laws of the United States, although the origin and subsequent history of the nation proclaim its essentially Christian character.

While it is true that no mention of a Supreme Being, nor of the Christian religion, occurs in the Constitution, it must be inferred that its framers regarded these as established facts, as the General Government and the Governments of the several States distinctly recognise in their official acts Christianity in its various forms as the religion of the country.

The laws for the observance of the Sabbath, the appointment of chaplains in various departments of the Government, and the oath in courts of law, may be cited as evidences of this.

The religious bodies are divided into numerous sects, known as evangelical and unevangelical. Among the Evangelical Protestants the distinctions are unimportant, the principle "in essentials, unity; in non-essentials, liberty," obtaining by universal consent. Episcopalians, Methodists, Baptists, Presbyterians, and Congregationalists, rank as evangelical; while Unitarians, Universalists, and Swedenborgians may be classed as unevangelical. The latter are found especially in New England, where Congregationalism is also a large and influential element.

Owing to the large influx of foreign population within the past fifty years, especially from Ireland, Romanism has increased rapidly, and is making itself prominent as a political force, although its converts are principally among the uneducated classes. The ratio of increase during the last decade has been about 35 per cent, and at present, in a population of 40,000,000, the Romish Church includes within her pale 4,500,000 people and 23,000 priests. Her strength lies principally in the large cities of the north, whither the tide of emigration flows. In the Southern States, the Baptists and Methodists are most largely represented, especially the latter; and the lower Middle States still retain the character given them by their settlers, who were adherents of the English Church, or, in some few localities, of the Roman Church.

In the newly-settled portions of the "great West," all possible shades of religious opinion are represented, attended by the crudeness always characteristic of society in its formative state. Owing to the freedom of the religious atmosphere, and the great activity of mind prevailing in a new country, there is an abundant opportunity for any who wish to establish new theories, or for enthusiasts or religious quacks who wish to obtain a following. Hence the communities known as Mormons, Spiritualists, etc., the ranks of the former being recruited principally from the dregs and offscourings of European society. The churches of the East, however, have not been slow in following the tide of emigration to the West, and for the past fifty years missionary agencies have been actively at work, and churches have been planted in all portions of the West.

To speak comprehensively, the United States ranks among the Protestant Christian nations of the world, and is the country of all others where religious liberty finds its fullest and most perfect development. As a result of

this, the public mind is ever in an attitude of inquiry; and any truth, whether scientific, moral, or religious, must bear the test of close and severe scrutiny, and must be weighed and sifted in the scales of public opinion, before it can find acceptance to any great extent.

2. *Eccentric Forms of Religious Development.*

Amongst the sects that Protestantism has given birth to, some call for more special consideration, as characteristic of the social and religious life in the Transatlantic States. Mediæval history has preserved a record of some peculiar moral epidemics. The "black death" that raged in the fourteenth century gave rise to the sect of the "Flagellants." All Germany, Hungary, Poland, Bohemia, Silesia, and Flanders, contributed their quota to this mania. At the end of the same century there broke out a dancing rage, the rapid spread of which gave rise to serious apprehensions.

The Jumpers, Shakers, and Spiritualists of the present day are the direct descendants of those mediæval dancers.

3. *The Shakers: Their History and Constitution.*

The sect of the Shakers, founded by the Englishwomen Jane Wardlaw and Ann Lee, has thriven for nearly a century on American soil. "Mother Ann," the daughter of a poor Manchester blacksmith, could neither read nor write, but while still a child was favoured by "heavenly visions," or, as her mother thought, was a prey to hysteria and convulsions from her birth. In the hope of effecting a cure, her mother married her at a very early age to Abraham Stanley, a young blacksmith, by whom she had four children, who died young. With Stanley she lived so unhappily that he gladly gave her permission to join

the sect of Jane Wardlaw, known afterwards by the name of "Shakers." She soon became their leader under the designation "Mother Ann."

Their fundamental doctrines required a community of goods, celibacy, love of peace, and the separation of Church and State. Ann proclaimed, through the revelations she was vouchsafed, that Adam's sin consisted in his marrying Eve, thus peopling the world with a lawless posterity. She further announced that for this posterity the time had come to sacrifice themselves, at least that the chosen few should show by their abstinence from earthly love how the world was to be regenerated. Hence her fixed idea was that both she and her followers were called upon to make eternal war against the flesh. But she does not seem, like her later disciples, to have taught that God possessed a double nature, male and female, and that Christ was the incarnation of the one, and she herself of the other. She rested satisfied with inculcating the duty of celibacy, and as in this way the sect would soon die out, they were instructed to seek for new proselytes. This has always succeeded best on the occasion of the so-called "revivals," spasmodic fits of religious frenzy, which give us a deep insight into the aberrations of the human mind.

On the other hand, Shakerism presents a more agreeable side, which it would be unfair to overlook. There are at present eighteen communities in America, numbering altogether 2400 members; nor can it be denied that they have given practical application to certain communistic principles with remarkable success. Each neophyte is required to consign all his effects to the community for a period of one year, after which term of probation, or sooner if he so desires, he may withdraw from the union, but without receiving interest for his capital, or wages for his work. Once accepted, he is bound to perform all the work imposed on him, receives a separate dwelling, takes

his meals in common with the rest, has his clothes from a common store, but never touches money unless he is one of the few chosen to transact the necessary business with the outer world.

The American Shakers are mostly devoted to agricultural pursuits, and to such traffic with the neighbouring places as may be required to supply all their more urgent wants. They make their own clothes, and are altogether in the position of being able to satisfy, at the least possible outlay, all their necessities, reduced as these are to a minimum. They eat but little meat, and limit their drink to weak tea and coffee. Bread and milk, fruit and vegetables raised by themselves, form their chief nutriment. Celibacy is strictly enforced, men and women scarcely ever meeting except at the common meals and the frequent religious exercises. The sexes meet also at their dancing parties, on which occasions, when too sorely vexed by the spirit, they are apt to fall into a sort of ecstasy, or delirium, or what vulgar people would perhaps call hysteria. But these ecstatic exercises are not of very frequent occurrence. Younger members, after a few years, generally withdraw from the union (Charles Nordhoff, *The Communistic Societies of the United States, etc.*, 1875). The moral character of these "peculiar people" is said to be above the shaft of censure.

4. *The Inspirationist, Perfectionist, etc.*

On the fruitful soil of the United States sects spring up like mushrooms, and those, in one form or another, doing homage to the principles of communism are but a small fraction of the innumerable little communities spread over the wide domain of the reformed Church. Amongst the communistic sects may be mentioned the Rappists, or the Harmonia, now dying out; the Inspira-

tionists, and the Oneida Perfectionists, interesting accounts of which may be seen in Hepworth Dixon's *New America* and *Spiritual Wives*. Some years ago there were no more than 283 Perfectionists, yet they would seem to share with the Shakers the greatest amount of vitality. They aim at the improvement of the human race without condemning it to an act of self-immolation. Hence they do not go so far as to destroy marriage, contenting themselves with rejecting as sinful all the nobler instincts of love and devotion, which in the eyes of civilised men impart its hallowed character to the state of wedlock.

5. *The Jehovah People.*

Probably the very newest sect in America is that of the so-called Jehovah People. They are settled at Mocopin in New Jersey, and their religious gymnastics forcibly recall the already-mentioned Flagellants of mediæval times. They sing and dance together, dislocate their joints, indulge in frantic capers, and altogether demean themselves like maniacs. They arose in this wise:—Their present "prophet," the rustic Nathaniel Merril, dreamt, as he lay beneath a tree, that he could fly. Taking this for a revelation, he climbed the tree, stretched himself out, flapped his arms like wings, and soared down, alighting on some soft mould without breaking any of his bones. Encouraged by this success, he returned to his perch, again flew down, and again escaped unhurt. Having repeated the exploit for a third time, Nathaniel looked upon himself as a work of Providence. He hastened to the village, began to run and skip about and turn head-over-heels, shouting and dancing and crying out that the Holy Ghost had taken up His abode in him. Thereupon the epidemic broke out in Mocopin. Every one took to jumping and tumbling and kicking up

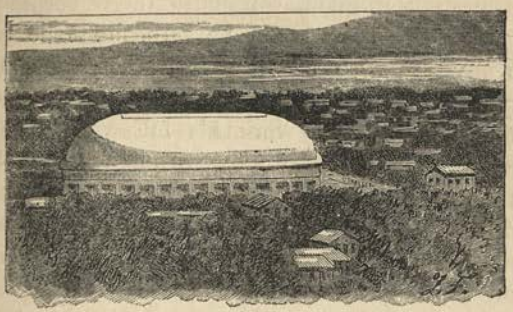
his heels, and next Sunday the minister could scarcely believe his eyes when in the middle of the sermon his congregation began to repeat these antics. But from that day the Jehovah people were duly established, and set about acquiring proselytes. They are the strictest Sabbatarians, allowing neither fire nor cooking on the Lord's Day, but every one is at full liberty to leap and dance and caper about to his heart's content (*Wanderer*, of July 29, 1872).

6. *Mormonism.*

But the most important of these communists, both socially and politically, is unquestionably that of the Mormons, or "Latter-Day Saints," settled on the shores of the Great Salt Lake in Utah, where they have converted the wilderness into a smiling garden, and set up a State within the State. Fanatical enthusiasm for a palpable fraud, theocratic combined with democratic institutions, polygamy not merely permitted but openly preached, gross materialism side by side with belief in the Bible, very remarkable successes wherever they have settled, while the leaders themselves are animated by purely selfish motives,—all these circumstances have long attracted to the young State rising by the Salt Lake amidst the Cordilleras the earnest attention of all interested in the affairs of the New World.

It is quite a mistake to suppose that the Mormons lead a disorderly or dissolute life. On the contrary, there prevails the greatest order amongst them; neither mendicants nor "loafers" are anywhere to be met, and what was a dreary waste so recently as the year 1847 has now become in their hands a highly-cultivated region. The people seem to be quiet, peaceful, and industrious. Women, young and old, lose their cheerfulness, and assume a sad and earnest expression; and the men, though producing a

more pleasing impression, generally betray a lack of intelligence. We soon begin to feel that society has here been developed very differently from that in the rest of the United States, having acquired an organic character anything but republican in its main features. Some 80,000 or 100,000 sober, industrious men, and even devout after their fashion, permit their leaders to indulge in the most unbridled licentiousness; and the tribute they lay at the feet of their rulers they speak of as sacrifices offered to God.



UTAH, WITH THE MORMONS' TABERNACLE.

7. *Joseph Smith—"The Book of Mormon."*

Joseph Smith, founder of Mormonism, was the son of a farmer of Sharon, Windsor County, Vermont. He was born on September 23, 1805, and some forty-six years ago began to surround himself with followers, who gave out that he was a prophet sent of God, or rather a second Messiah. In order to support his pretensions with the necessary mystifications, he produced certain golden plates engraven "in Egyptian characters," and professing to contain the laws and records directly dictated by God Himself. He further pretended that he had been enabled to decipher these records by means of an instrument

revealed to him in a vision, and described by him as a "curious instrument, which the ancients called Urim and Thummim, which consisted of two transparent stones set in the rim, on a bow fastened to a breastplate." The plates were said to have been written soon after the destruction of Jerusalem by Mormon, a Jewish prophet, and by him brought to America, where they were afterwards buried. Smith retained the Old Testament, mutilated the New, and supplemented all the obscure points of the Christian religion, especially those turning upon the future state. In 1830 he published the *Book of Mormon*, professing to be translated from the plates by means of the above-described instrument, and embodying his new doctrines. This work his followers hold in the same veneration, and look upon as possessing the same authority, as the Bible itself.

Smith selected twelve apostles, and by means of miracles and many fresh revelations soon attracted a large number of the curious, many of whom became believers, his convenient positive tenets suiting the tastes of a certain type of weak-headed doubters.

8. *Nauvoo.*

Driven from the State of Ohio, the Mormons pitched their tents in the, at that time, still uncultivated district of Nauvoo, "the beautiful," on the banks of the Mississippi, in Illinois. Here they increased rapidly, and even began to erect a vast temple, large enough to contain the whole people. Meantime Smith devised a political constitution, giving him the fullest autocratic powers, and although at that time he preached and wrote against polygamy, this doctrine was already laid to the charge of his adherents, together with many other unpopular institutions, exciting the ill-feeling and antipathy of the people

on both sides of the Mississippi. Joseph became constantly embroiled with the authorities, Nauvoo was attacked, the prophet arrested, lodged in Carthage jail, and soon after murdered by the rioters, together with his brother Hiram, who had also been confined in the same prison. This occurred on June 7, 1844.

9. *Brigham Young, "The Lion of the Lord"—Deseret.*

A Mormon named Rigdom now became President, but was soon replaced by a certain Brigham Young, "the Lion of the Lord," who began forthwith to look out for a land where he might govern his people after his own pleasure, without danger of further interference on the part of "the Gentiles." He first of all led his followers to the western limit of civilisation, boldly crossing the ice-bound Mississippi in the month of February, and settling temporarily in the west of Iowa. From this point Brigham made reconnaissances beyond the Rocky Mountains, and at last made choice of the desert shore of the Great Salt Lake in Utah, at that time belonging to Mexico, in the hope of thus for ever escaping from the Government and people of the United States. Thither the "Mormonites" migrated in 1847, encountering incredible difficulties and privations in this journey through the wild regions still occupied by savage Indian tribes. The place, by them named Deseret, in the Territory of Utah, was the very next year ceded by Mexico to the United States, and twenty years later its isolation was again disturbed by the Great Pacific Railway crossing the entire continent from ocean to ocean. Mormonism was once more brought into collision with the outer world, and became, as it still remains, a public scandal and eye-sore in the United States.

After proclaiming himself the successor of Joseph

Smith, Young assumed the office of "prophet." According to his teaching God spoke through him, as through an oracle, to His chosen people. He claimed to be the successor of Christ Himself, and by the great body of his

BAPTISM OF A (NEW) MORMON CONVERT.

adherents was looked upon as being as powerful and glorious as the Redeemer. Christ, they say, was the first, Joseph Smith the second, and Brigham Young the third Messiah. They rely more on the Old than on the New Testament, and Abraham and David are the greatest

of the patriarchs. Although baptism is still performed in the name of the Saviour, still Mormonism resembles Christianity on the whole perhaps rather less than does Mohammedanism.

10. *Polygamy.*

Young strengthened his own position, and made polygamy a doctrine of the Church, declaring that this dogma had been revealed to Joseph nine years previously. But his wife Emma and other members of Smith's family deny this, and have caused a schism in the church. The recalcitrant Josephites were persecuted, and in 1864-5 withdrew mostly to Iowa. Another schism, occasioned by a certain Joseph Morris in 1866, was stamped out with bloodshed, a few families escaping with their lives to Idaho.

According to Brigham's teaching, the men have divers ranks in heaven. The more numerous his wives and children, the greater his earthly merits and the higher his heavenly dignity after death. The women enter heaven only through their husbands; hence it becomes all-important for every girl to get married. If her husband has other wives, and if she has to endure many trials and humiliations on earth, the more glorious will be her position in the heavenly kingdom. Accordingly young women on their deathbed get married, or "sealed" to a man—where possible to a minister of the Church—as she secures through him a higher rank in heaven.

11. *Constitution of Mormonism—Schism—Prospects.*

Young controlled everything. He was the supreme judge, and also the recipient of the bulk of the revenue and of the tithes. He alone decided what was his and what belonged to the Church; he had the best of

everything, the best workshops, farms, mines, and so on. He distributed office, and to the twelve apostles he added the council of seventy, in whose number are the bishops and elders. Besides their official duties these men carry on the most profitable industries in the country, some being merchants, others manufacturers and hotel-keepers, and as they enjoy the largest incomes, they possess also the greatest number of wives.

The needy Mormon has one wife only, their number increasing with his worldly prosperity. Occasionally the wives support by their work not only their children, but their husbands also; but it is a mistake to suppose that the women alone are bound to labour while the men look on. Generally speaking, the whole sect is distinguished by extremely industrious habits, the so-called elders setting an excellent example in this respect. These elders were well schooled by Brigham; they instruct the people, confirm them in the faith, and provide at once for the spiritual and national welfare. Their office carries no direct remuneration with it, but their position is otherwise so good that they can very well afford to dispense with this.

Recently a fresh schism has disturbed the harmony of "the Saints." The Prophet has hitherto in vain attempted to suppress it by sentence of banishment and expulsion from the community, and the latest returns show as many as from 5000 to 10,000 "dissenters" rejecting the doctrine of polygamy in a total population of 150,000 in the State of Deseret. But a still more formidable foe to the community is the Congress of the United States, where the "Mormon Question" now constantly crops up, and must continue to do so till finally set at rest. The Cullom Bill of 1870, aiming at "the suppression of polygamy," was tabled, but next year the Government decided to take summary proceedings

against the Mormons, though nothing could be done in consequence of the unsatisfactory state of the laws affecting such matters.

In 1873 Brigham entertained the project of abandoning Salt Lake City, and removing with the greater part of the saints to Arizona, but the unfavourable reports of the Mormon pioneers in that region compelled him to give up this plan. In June 1874 the first serious blow was struck at polygamy, when the Lower House accepted the principle of the Poland Bill, declaring that polygamist judges and juries were incompetent to conduct civil and criminal trials and prosecutions of polygamists. The object of this measure is to protect the Mormon women by ensuring to them a fair share of the family effects in case of divorce,—in a word, to alleviate the hard lot of those who have come to be regarded as female slaves. Meantime the Mormon women themselves seem to be anything but grateful to the Government for its efforts on their behalf. In the beginning of 1876 a petition was presented to Congress, signed by 22,626 Mormon wives and daughters, praying for the rejection of the law against polygamy, and for the admittance of Utah as a State of the Union. These female advocates of polygamy declare that no force or other unfair means have been employed to secure their signatures, and that no girls under twelve have been allowed to sign the document.

Since the year 1870 the largest accessions to their numbers have come from Denmark and Sweden, and quite recently they have been joined by many energetic East Prussians, possessed of considerable means. The Latin races, such as the French, Spaniards, Portuguese, and Italians, seem to be utterly opposed to Mormonism, and we are assured that not a single Frenchwoman is found in their seraglios. The great majority belong to the Anglo-Scandinavian races, though the Indian tribes

between California and Utah are also said to become Mormonised very rapidly.

On the other hand in the community itself a tendency is continually showing itself to revert to European views of morality and social habits. This is attributed by Hepworth Dixon not so much to moral motives as to the inherent feminine weakness for vanity, love of finery and dress. But the destruction of Mormonism will probably be ultimately due mainly to the Pacific Railway. Through it the hitherto unknown extravagance of the female fashions has penetrated into Great Salt Lake City, and if a man finds it difficult to indulge the taste of one wife for such things, most of them must shrink from the prospect of having to provide for the caprices of a numerous harem. Not every one is endowed with the colossal wealth of a Brigham Young, which alone could enable them to indulge in such a luxury, and the conviction is slowly gaining ground that from the economical point of view polygamy is a mistake. This idea once thoroughly established, it must gradually die out.

RAIN-MAP OF THE UNITED STATES AND OF PART OF THE DOMINION OF CANADA.

London: Edward Stanford, 55 Charing Cross.

CHAPTER XVII.

MATERIAL PROGRESS.

1. *Agriculture.*

UNTIL recently agriculture formed by far the most important occupation of the Americans, giving employment to 22 per cent of the entire male population. The number of farmers possessing an average of 80 acres of land amounted in 1874 to some 3,000,000, and there is altogether as much as 734,000 square miles parcelled out in small allotments already under cultivation. A free grant of 160 acres is made to all immigrants willing to settle in the vast public lands of the Far West.

The entire arable area of the United States, exclusive of Alaska, is estimated at about a million and a quarter square miles, but it varies exceedingly in the nature of its products and the manner of its cultivation in the various States. There may, on the whole, be distinguished a northern corn-growing country, a central cotton, and a southern sugar, region. But the chief contrast is presented by North and South, roughly separated by the 37th parallel. In the Northern States, producing wheat, rye, barley, oats, buckwheat, and potatoes, we find the usual agricultural methods carried on by free labourers.

Of late years wheat especially has been grown to such an extent that America may yet enter the European market as the most formidable future rival of Russia, although under existing circumstances still unable to com-

pete with that country, and far less with Hungary and the Danubian principalities. In all the States of the Union, except Texas, Nebraska, and Minnesota, which showed a falling off, the area of land under wheat has been enlarged. The best wheat-growing States are New York, Pennsylvania, Maryland, Ohio, Michigan, and the northern parts of Illinois; but it flourishes also in Missouri, Indiana, parts of Kansas, Kentucky, Tennessee, Georgia, and lastly in California.

2. *Maize, Oats, Potatoes, etc.*

Rye grows mainly in Pennsylvania, New York, and New Jersey; barley in New York. A very important grain is undoubtedly maize or Indian corn, or simply corn, as it is usually called.

In all the States it forms a very important article of produce, but above all in the central zone, comprising Indiana, Kentucky, Ohio, Tennessee, and Illinois, besides the Atlantic States of Delaware and New Jersey. In the year 1866 the maize crop was estimated at the enormous amount of more than 100,000,000 bushels.

The cultivation of oats in a large way is limited to the Central, Western, and Northern States, while buckwheat is grown mainly in New York and Pennsylvania. The potato, originally indigenous in South America, is grown extensively in the Northern, Central, and Western States only; while vegetables flourish best in the North-east, where also "orcharding" has been most highly developed.

Of late years the cultivation of the nettle has been successfully introduced into Louisiana and Texas, and in California efforts have been made to grow it on an extensive scale. By using it as the warp English manufacturers have produced a new and elegant tissue of the fibres of this plant combined with cotton. Samples of this material

were sent to San Francisco, where an agency has been opened for its sale. It is remarkable for great durability, and the plant, which belongs to the thistle family, is easily propagated by cuttings. It is perennial, yielding yearly from three to four crops, averaging about 3000 lbs. to the acre, and at present worth £21 : 10s. a ton. The thread is longer and more silky than cotton, mixed with either cotton or wool produces a very fine tissue, and unmixed is capable of being woven into a texture resembling Lyons silk.

3. *Wine and Tobacco.*

Amongst the useful products of the northern and central zones there remain to be mentioned wine and tobacco. Vine culture proved a success as soon as the attention of cultivators was turned from the foreign to the native growths, and vineyards now flourish in Ohio, California, Pennsylvania, Indiana, North Carolina, and Missouri. The city of Los Angeles in California claims to possess the most extensive tract of vine-growing land in North America, and about thirty miles from this place is Anaheim, a German hamlet scarcely fourteen years old, but already the centre of an important vine district.

Tobacco, forming a very important staple of export, although growing in most of the States of the Union, flourishes principally in Maryland, Kentucky, Virginia, Tennessee, Connecticut, North Carolina, Missouri, and Ohio.

4. *The Plantations—Cotton and Sugar.*

In the Southern States the so-called plantation system is greatly in the ascendant, producing the staples of trade elsewhere usually met with in the tropics, and generally known as "colonial produce." Hitherto cotton has been of paramount importance. In the twelve Southern States

there were at one time as many as 77,000 plantations, previous to the civil war, worked by slave labour. In 1784 there were exported to Europe 8 bales, in 1821 about 425,000, and before the war broke out as many as 3,500,000.

During the period of the war from 1861 to 1865 there were of course no returns, but the largest crop ever raised was in 1859-1860, amounting to 4,861,292 bales. The war for the time ruined this industry, and in 1868 the yield was only 2,519,554 bales. Since then, favoured by many exceptional circumstances, it again rose to about 4,000,000, but since 1870 has once more somewhat fallen off. At the same time, in all the Cotton States, except Florida, the area under cultivation has been reduced, the reduction in 1871 averaging from 14 to 15 per cent as compared with the previous year, since when it has continued to decline. A report of the Memphis Agricultural Bureau, covering half of the cotton crop, calculates the diminution in 1874 at 6½ per cent as compared with 1873. The report of the crop for the year 1878 shows it to have been the largest yet raised.

The cultivation of the sugar-cane is restricted to the extreme south, being most extensively pursued in Louisiana, and next to it in Alabama and Texas. Maple sugar is produced principally in New York, Massachusetts, New Hampshire, and Ohio. Southern fruits, such as the melon, oranges, and figs, flourish chiefly in California and along the southern seaboard.

5. *Cattle-Breeding—Farm Stock.*

The breeding of horses is restricted mostly to the North, being replaced by that of mules and asses in the Southern States. In the East and the Mississippi Valley the horses are of good size. Fine breeds of heavy

animals for draught purposes are raised, while the trotting and running stock are deservedly celebrated all over the world. In the West, though generally of small size and rather indifferent appearance, the native horses are strong, and display great staying powers.

Horned cattle are raised in vast numbers in all parts of the country, and especially in Texas, on the plains, and in the Pacific States. Sheep, also, have a great range, practically coincident with that of cattle; and sheep-raising is at present a very profitable industry. The raising of hogs is a very great industry in the Mississippi Valley States. The management of bees has proved most profitable in Pennsylvania, Ohio, New York, North and South Carolina, and recently some very choice California honey has found its way into the English market. The birds principally reared on the farms are poultry, turkeys, guinea-fowl, geese, ducks, and pigeons.

6. *Timber—Reckless Destruction of the Forest—Hunting and Fishing.*

Notwithstanding the extraordinary wealth and variety of forest timber, especially in the inland States between the Alleghanies and the Mississippi, including the mahogany, cedar, oak, maple, etc., forestry itself has been strangely neglected. The clearances have been consequently effected with such astounding rapidity that the time has already come to impose some check on the reckless destruction of timber. No less than 8,000,000 acres are yearly consumed, while not more than about 10,000 are freshly planted. Chicago alone requires an annual supply of 19,000 acres of timber; and in a period of ten years as much as 12,000,000 acres of forests were burned down, merely in order to clear the land the more rapidly. In Wisconsin 50,000 acres are annu-

ally felled to meet the requirements of Nebraska and Kansas.

Hunting, especially in the North-west, is directed principally against the daily diminishing fur-bearing animals. The lake and river fisheries, though of considerable importance, cannot be compared with the cod, whale, and seal fishing, carried on chiefly by the Northern States in the neighbouring waters, but more especially in the South Pacific.

7. *Manufactures.*

Previous to the year 1870 manufactures of every sort had received such an enormous expansion that the people of the United States began to turn from the field to the factory. Apart from the mines, there were 252,148 manufactories, with an invested capital of upwards of £4,200,000,000, yielding yearly returns valued at £9,250,000, and paying wages to the amount of £15,887,000.

As regards the agricultural interests, it cannot be denied that, under the present wasteful system of cultivation, much of the old soil is well-nigh exhausted, so that fresh and virgin soil must constantly be opened, and this in part explains the great migration of farmers to the arid and semi-arid regions of the Great Plains and the valleys of the Cordilleras, where agriculture is impossible without irrigation. Another natural consequence is, that the people turn to more profitable pursuits, such as are offered to them in the workshops of the manufacturer. Nor can there be any doubt that the industries would have been still more developed but for the obstacles presented on the one hand by the high rate of wages occasioned by the scarcity of labour, and on the other by the cheapness of imported English goods. To meet this second difficulty the American political economists had

recourse to a high protection tariff, pressing heavily on the people themselves, and causing many branches of industry actually to decline. The well-established principles of free trade have been thus once more abundantly vindicated in the New as they have so often been in the Old World.

8. *Mercantile Interests—Decline of the American Carrying Trade.*

The American carrying trade was ruined by Southern privateers during the civil war, and the American vessels, whose flag fluttered in every harbour in the world, have well-nigh disappeared from the high seas. While the mercantile marine of England numbers 22,870 ships of 9,136,916 tons burden, that of the United States is reduced to 7312 ships of 2,387,376 tons, besides 578 steamers of 692,576 tons. Yet fifteen years ago the American flag eclipsed that of Great Britain.

Of the many lines of steamers plying between Europe and America but one is owned in the States. The foreign trade reached the enormous figure of £260,494,525 in 1873, but the exports amounted only to £124,453,017, against £136,041,515 of imports. Since that year the balance of trade has turned in favour of the United States, and now the exports are largely in excess of the imports, and rapidly increasing.

9. *Inland Trade—Railways and Canals.*

The inland trade has been enormously developed, and is greatly facilitated by the grand natural water highways, numerous canals, and railways. A country where expedition is of the last importance could not dispense with a widely ramifying network of railway lines. There are

upwards of a hundred canals, amongst which are the Pennsylvania Canal, connecting the Susquehanna and Ohio, and the Erie connecting New York with the Canadian Lakes. The latter is 378 miles long, has eighty-five locks, is carried by aqueducts—some of them very imposing—over more than thirty rivers, is connected by means of branches with the Mississippi River system, and is navigable for steamers.

On all these natural and artificial water highways there ply upwards of 4000 steamers, the total tonnage of all vessels engaged in the lake, river, and coasting trade amounting to 3,101,000. And yet these vast means of transit are far below the actual requirements of the local traffic.

The railway system has also already grown to colossal proportions, notwithstanding its comparatively recent origin. The first company was formed in Baltimore in the year 1827, under the name of the "Baltimore and Ohio Railway Company." The first line was opened by this company on July 4, 1828, as far as the borders of Maryland; but it was at first worked by horse-power, the first locomotive not making its appearance in the States till the year 1830. This engine, which was of English manufacture, ran between Mohawk and the Hudson, but was only 6-ton weight, and soon proved insufficient for the traffic. It was replaced by one weighing only 3 tons from the Cold Spring Works in New York. Lines now began to be laid down so rapidly that there was a total length of 1100 miles in 1835 and 6192 in 1848. They received a fresh impulse through the discovery of the Californian gold-fields, attaining a total length of 81,840 miles in the year 1879. The carriages are well fitted up, often in a sumptuous manner, as, for instance, the "Silver Palace" Cars on the Central Pacific, and "Pullman's Palace Saloon and Sleeping Cars." Hence the comfort of railway travelling in the States far surpasses anything of the kind in

Europe. Unfortunately the indifferent construction of the lines themselves, combined with the reckless management, often leads to fearful catastrophes. In 1873 there were thus sacrificed as many as 576 lives, besides 1112 more or less seriously injured.

On the other hand, wonders of engineering skill have been achieved in their construction—such, for instance, as the Pacific line, with its steep grades over the Sierra Nevada, or the tunnel through Mount Hoosac in Massachusetts, giving Boston direct railway communication with the Hudson and the West. This work was completed on November 27, 1873, and can be compared in extent only with the Mont Cenis Tunnel, which, however, it surpasses in the amount of labour, cost, and time expended on its construction. It is a worthy rival of the Sutro Tunnel in Nevada.

10. *National Wealth and Liabilities.*

The prosperity of the people of the United States, as estimated by the value of the movable and immovable property of the country, was represented in the census of 1870 by the sum of £6,150,000,000. Since then the national patrimony has been on the one hand greatly augmented by the discovery of fresh natural resources, and on the other diminished by the commercial crisis of 1873, the consequences of which still continue to be felt. Nor can it be denied that a heavy burden is imposed on the people by the national debt of £390,000,000, the legacy of the great civil war, and by the liabilities of the various States, counties, and municipalities, amounting altogether to about £126,000,000. Still it is to be hoped that better management and more careful measures may enable the country, with its incalculable natural resources of every sort, to recover from these evils.

CHAPTER XVIII.

POLITICAL ADMINISTRATION.

1. *The Federal Constitution.*

THE fundamental law of the land is based on the constitution of September 17, 1787, with the amendments of the years 1791, 1798, and 1804. The Union hereby forms a league of democratic and sovereign free States, each of them absolutely independent, with the reservation of certain rights and of all matters affecting the general weal of all the Union. These imperial interests are referred to a central administration. The constitution recognises a legislative, an executive, and a judicial power, the legislature being exercised by a National Congress, assembling at least once a year, and consisting of two chambers—the Senate and the House of Representatives. All the laws must be submitted to the deliberation of Congress and passed by a majority of votes. To it also are referred all questions of peace and war, treaties with foreign powers, augmentation of the land and sea forces, all imports, excise and customs dues, the coinage, weights and measures, privileges and patents, admission of new States, and so on.

2. *Congress.*

The Senate is composed of two senators from each State, chosen for six years by the local legislatures, and in such a way that one-third of the body are elected afresh

every two years. Each senator has one vote, must be thirty years old, eight years a citizen of the Union, and at the time of his election a resident of the State he has been chosen to represent. The Vice-president of the United States is *ex officio* President of the Senate.

The House of Representatives consists of members of the various States, and delegates of the Territories, the latter of whom may take part in the deliberations, but possess no votes. The Members of Congress are elected for two years by the people of the various States according to the methods of election peculiar to each of them. Every representative must be twenty-five years of age, seven years a United States citizen, and at the time of his election resident in the State electing him. The Lower House chooses its own Speaker and other officers, and possesses the exclusive power of impeaching them, as well as the President and Vice-president, and all other civil functionaries, for violations of their public duties.

All the public taxes are voted by the House of Representatives, but other measures may be initiated by the Senate. Before becoming law every Act must be presented to the President of the Union for his signature; but should he refuse to sign it the measure is again submitted to Congress, and then becomes law if carried by a majority of two-thirds of both Houses.

3. *The Executive—the President.*

The Executive is entrusted to the President, who, like the Vice-president, is chosen by electors specially appointed for the purpose by the people of the several States. He holds office for four years. Both President and Vice-President must be native Americans, resident in the country for fourteen years, and thirty-five years of age. The presidential rights and duties are much the same as those

of a constitutional monarch, with the limitation that Congress alone can declare peace and war, while the President can conclude treaties only with the consent of two-thirds of the Senate. His nomination of the civil and diplomatic functionaries is also dependent on the approval of the Senate, and he is further enabled to exercise only a limited veto on the measures submitted to him for his acceptance by the Congress. Before assuming office he takes an oath to abide by the Constitution. His person is inviolable, but he is removable. On the other hand, he is re-eligible to office, and is *ex officio* commander-in-chief of the land and sea forces.

4. *The Judiciary.*

Justice is administered by a Supreme Court consisting of a chief justice and eight judges, besides whatever lower courts Congress may from time to time see fit to constitute. The Circuit Courts hold their assizes twice a year in every State under the presidency of a judge of the Supreme Court and of a Circuit judge alternately. In all the States there are district courts,—in the district of Columbia one, and in the larger States two or three. All criminal cases, except those referred to the Senate, must be tried by a jury, whose verdict, to carry conviction, must be unanimous. Judges are appointed for life by the President, and can be impeached and removed by Congress alone.

5. *Constitution of the States and Territories.*

The democratic constitution of the several States is framed mainly on the model of the central administration. In all that concerns their internal affairs their authority is to a great extent supreme, while everything effecting the common weal and the general security of the Union is

entrusted to the Federal Government. The provincial legislative bodies are also divided into a Senate and a House of Representatives, whose joint co-operation is usually required for the enactment of laws. The Executive in all the States is intrusted to a governor elected by the qualified voters. The tenure of office of these governors, senators, and representatives, and the number of the two latter bodies, vary in the several States.

Each State is complete in itself, and is divided into counties, and then the counties into townships, frequently consisting of a single city, but often comprising several centres of population. The capitals, often situated in a central position, are scarcely ever the largest towns in the States, but always the seat of the local government; nor can the practical wisdom with which these bodies have been thus withdrawn from the influence of populous cities be sufficiently admired.

Similar to the constitution of the States are those of the Territories, which are regarded as the common property of the Union. Here the Executive is intrusted to a Governor, appointed for four years by the President, with the approval of the Senate. The Legislative Assembly consists of a Senate and House of Representatives elected by all those entitled to vote; but its legislative power is so far limited that all measures passed by it must be submitted to Congress for ratification. The admittance of Territories into the Union is conceded by Congress as soon as the number of the inhabitants has reached a certain figure, varying with the increasing population of the Union.

The District of Columbia is placed under the immediate control of the Federal Government.

6. *The Cabinet.*

The general business of the Administration is conducted by the Cabinet, residing at Washington, the capital of the Union, and consists of seven members bearing the title of secretaries—the Secretary of State or Minister of Foreign Affairs, and those of War, the Navy, the Treasury, the General Post-Office, Attorney-General, and Home Department, or Department of the Interior. They are appointed by the President, with the advice and sanction of the Senate, but are liable to be dismissed by the President at any moment. The President is not bound to adopt the policy of his Cabinet; nor are its members, on the other hand, responsible for his doings.

7. *Revenue and Expenditure—Land and Sea Forces.*

The Revenue for the financial year ending June 30, 1880, amounted to £66,700,000. The Expenditure for the same year amounted to £53,500,000, leaving an excess of Revenue over Expenditure of £13,200,000.

The land forces of the United States consist of the regular army and the militia of the several States, in which, with certain exceptions, is enrolled every citizen capable of bearing arms between his eighteenth and forty-fifth year. The regular or standing army amounts at present to no more than about 25,000 men, and to keep it on this footing there require to be annually enlisted about 600 recruits. The yearly outlay involved is about £7,600,000. The active list comprises a general, a lieutenant-general, four major-generals, and four brigadiers. The army includes a corps of engineers, an artillery and a signal corps, besides ten cavalry, five artillery, and twenty-five infantry regiments, the staff of the military academy, and an Indian corps of observation.

On January 1, 1872, the fleet comprised 51 iron-clads of various classes, mounting 127 cannon; 58 screw-steamers, with 865 cannon; 10 paddle-steamers, with 72 cannon; 20 sailing-vessels, with 215 cannon; 28 steam-tugs, with 11 cannon; 3 store-ships with 12, and 6 revenue-cutters with 88 cannon—making a total of 176 vessels and 1390 cannon. The naval commissioned officers numbered 1360.

CHAPTER XIX.

THE TERRITORY OF ALASKA.

1. *Physical Aspect of the Country.*

THE extreme north-west of America formed a Russian possession till June 21, 1867, when the whole of what was known as Russian America was ceded to the United States. This region, some 580,000 square miles in extent, consists mainly of the north-western spurs of the Rocky Mountains, is full of lofty snow-clad mountains and volcanoes, but thickly wooded in the valleys and the bays of the coast ranges. The west coast is deeply indented with fiords, off which lie the archipelagoes of the Prince of Wales and George III.

The straits separating Asia and America were first discovered by the Cossack Dschenew (read Jèneu) in the year 1728, and again eighty years later more carefully explored by Bering, after whom they are now named. Some of the volcanoes are very high, and the streams numerous, though still but little known. The climate varies much, but is far milder than that of the eastern seaboards of America and Asia under the same parallels. The north-west coast, as far as Alaska, enjoys a coast climate, with mild winters, cool summers, a copious rainfall, very favourable to the growth of timber, but preventing the further spread of fruit trees.

The Cascade Range, which, extending northward from the United States, hugs the western coast through British

Columbia, here preserves its position as the coast range, extending north-westward in a series of volcanic peaks, several of which are active volcanoes, as far as the peninsula of Alaska. Near longitude 142° it loses its distinctive character as a mountain chain, and merges with the ranges from the north and east, beyond which point it is known as the Alaskan Range.

In this Cascade, or St. Elias Range, are many very high peaks, rivalling in altitude the famous volcanoes of Mexico. Among them are Mount St. Elias, 14,970 feet; Mount Fairweather, Mount Crillon, and many others of nearly equal height.

Between the Cascade Range and the Rocky Mountains, in British America, are several ranges of hills, trending parallel to these mountain systems. Beyond them are the Rocky Mountains, trending at first nearly north-west, then turning west and even somewhat south of west, following the trend of the coast-line as that bends towards the peninsula of Alaska, and joins with the Cascade Range to form the Alaskan Range. The Yukon, the largest stream of the Territory, and one of the great rivers of the world, rises in British Columbia between the Cascade and Rocky Mountains, cutting through the latter of these in its western course to Bering's Sea.

North of the Rocky Mountains, the country, though broken and rough, contains nothing worthy to be called mountains, except the Romanzof Mountains.

2. *Inhabitants—Indians, Eskimos.*

Amongst the 70,500 inhabitants of Alaska there are scarcely 700 Russians, consequently not more than 1 to the 100. There are about 1500 so-called Creoles—that is, half-caste Russians and Indians. Of the 42,000 pure-blood Indians, some 15,000 only have been subdued, all

the rest leading a free and nomad life. On the east coast dwell the Eskimos, about 20,800 in number; and on the western islands 2500 Aleutians. New Archangel, the former seat of the Russian Government, which had scarcely a population of 850 twenty-five years ago, now numbers as many as 2200. After they had established themselves on the Amur, the Russians were able to utilise the wealth of the land in timber and furs, but it was in other respects rather a burden than a source of power to them.

3. *Agricultural Prospects.*

It is otherwise with the Americans, although the report of General George H. Thomas on the condition of Alaska in 1869 held out no immediate prospect of colonisation, nor, indeed, has anything since been heard of any such project. While the climate is extremely cold, there is far too much rain and too little sun for agricultural operations. At most of the settlements there are gardens producing radishes, turnips, lettuces, other watery vegetables, and excellent potatoes. But they last only a very short time, the humidity being so great that vegetables grow well enough, but do not ripen or run to seed. The same difficulty is experienced in cultivating barley, oats, or wheat. The stalk shoots up and remains green, the grain never fully ripening. There is relatively but little arable land, the best district, both as regards climate and soil, being the plateau on the east side of Cook's Inlet, stretching from Kenai to Chugachik Bay. Here we find a sandy alluvial loam, very rich and deep; still, though pleasant while it lasts, the summer is too short to allow of field operations being carried on successfully.

4. *Natural Resources.*

Although timber of the finest quality and well suited for building purposes grows in favoured districts, still Oregon, Washington, and British Columbia produce it in equal abundance, and in places where it is far more convenient to the market. The fisheries on the banks of the north-east coast of the Aleutian peninsula and archipelago are very extensive and productive, and salmon is met with in all the rivers. Besides the coal on Chugachik Bay, several beds are known to exist elsewhere, as in Koutznou Haven, in the Island of Kou, at Kassaan on Prince of Wales Island, and at Katmai in Alaska. But what has been said of the timber is equally applicable to the coal-fields in the neighbourhood of Puget Sound. On the whole, the most important pursuit of the people is seal-fishing.

5. *The Fur Trade.*

The following notes on the fur-seal and fur trade are taken mainly from Mr. Dall's admirable book on *Alaska and its Resources*, published in 1870.

The fur trade of Alaska has been widely known for a century, and its history is almost a history of the country. The furs were the principal if not the only objects which led to its exploration and settlement, and the trade in them is the only branch of industry which has been fully developed in the Territory, all others being forgotten in the enormous profits which have attended its successful prosecution. The sea otter, the fox, marten, beaver, and other animals, all furnish fur, but the fur-seal is the great source of the trade. It is at present obtained almost exclusively on the islands of St. Paul and St. George in the Bering Sea. From 1741 to 1869 not less than 6,000,000 of skins were obtained.

The seal arrive at the islands about the middle of June, and leave generally about the last of October. They

OTTER-HUNT IN THE ALEUTIAN ISLANDS.

are thought to spend the winter in the open sea south of the Aleutian Islands. The pups are born about the

middle or end of June. They are covered, when born, with fine black hair without down. The latter appears when they are about three months old, and about six months later the black hair is replaced by a stronger hair tipped with white or brown. They appear to feed on fish, and sleep in the water on their sides, with the upper flippers out of water. "They have three cries—a kind of roar, like that of a young calf, which indicates anger; a milder cry, which they use in calling to one another; and a kind of piping whistle when they are hot or tired. They come up in droves of many thousands on the hill-sides near the shore, and literally blacken the islands with their numbers. The rocks, which they have scrambled over for ages, are polished and rounded." The ground which they frequent is destitute of herbage, and the vicinity has a strong and disagreeable odour. "They fight desperately among themselves, each bull having five or six females which he defends with the greatest courage, while they look on complacently, or encourage him with their cries. The male has a mane and a longer tail than the female."

The manner of conducting the fishery is as follows:—A number of Aleuts go along the water's edge, and, getting between the animals and the water, shout and wave their sticks. The seal are very timid, and always follow each other like sheep; yet, if brought to bay, they will fight bravely. A body of four or five hundred having been separated as above from the main assembly, they can be driven very slowly by two men into the interior of the island, exactly as a shepherd would drive his sheep. Their docility depends on circumstances. If the sun is out and the grass dry, they cannot be driven at all. If the day is wet and the grass sufficiently moist, they may be driven several miles. Every two or three minutes they must be allowed to rest. Those who become tired are killed and

skinned on the spot by the drivers, as it is of no use to attempt to drive them. They would at once attack the driver, and perhaps seriously injure him. When the seal have been brought to a suitable place, they are left with some one to watch them until it is desired to kill them. The skins of old males are so thick as to be useless. The Russians restricted the killing solely to young males less than five years and more than one year old.

No females, pups, or old bulls were ever killed. This was a necessary provision to prevent their extermination. The seal are killed by a blow on the back of the head with a heavy sharp-edged club. This fractures the skull, which is very thin, and lays them out stiff instantly. The Aleut then plunges his sharp knife into the heart, and with wonderful dexterity, by a few sweeps of his long weapon, separates the skin from the blubber to which it is attached. The nose and wrists are cut around, and the ears and tail left attached to the skin. When the operation is over the skin is of an oval shape, with four holes where the extremities protruded. These skins are then taken and laid in a large pile, with layers of salt between them. After becoming thoroughly salted, they are done up—two together—in square bundles and tied up with twine. They are then packed for transportation to London, where all the fur-seal skins are dressed. The skin is shaved very thin by a machine which cuts the roots of the stiff hairs, and leaves the down which does not penetrate to any distance. The former are brushed away, and the down is dyed black or a rich brown, and we have the skins then in the shape in which we see them at the furriers. In 1868 the Aleuts received thirty-five cents each for the skins, the salt being furnished them; and in New York, at one time, they were delivered by the Russian American Company for $2·50 each. In 1870 the skins in the London market were worth about $5·00 each in gold.

The price of the salt and the freight deducted leaves a large margin for the trader after paying the Aleut his thirty-five cents.

The fur-seal were killed in immense numbers by the Russians. At one time 300,000 skins were destroyed in order that the market might not be overstocked. It was only when their numbers were very greatly reduced that the number annually killed was diminished and restrictions imposed.

The estimate by the Fur Company of the peltry furnished by Alaska in the seventy-six years from 1786 to 1862 is over 6,000,000 skins, which is unquestionably below the truth, as they systematically underrate their profits and the amount of annual production from motives of policy.

6. *Geology and Mineral Resources.*

The geological features of Alaska are but imperfectly known. The rocks belong mainly to the Cretaceous and Tertiary formations, although there are a few localities from which Carboniferous and Jurassic fossils have been obtained. Volcanic rocks also abound, and there is a very good record of volcanic phenomena, beginning with the year 1690.

During the glacial period Alaska was covered with a continuous sheet of ice, and now almost every deep gorge of considerable size between the high mountains has at its head a glacier, or the remains of one. Some of them are of extraordinary size and grandeur, and the American student of glacial phenomena needs no longer to turn to the Alps for a field of study.

"At the commencement of the cold period, huge animals, covered with hair to resist the severe temperature, sprung into being. The elephant roamed over the

tundri of North America and Asia. Later, the reindeer and musk-ox followed the arctic vegetation as it spread southward" (Dall).

Hot springs, mud craters, and solfataras, are abundant in many parts of the Territory. Coal is the most valuable of the mineral productions, and is found at numerous localities. Fine Carboniferous coal is found, although most of it is Cretaceous in age. Anthracite has been reported, and is due probably to local metamorphism through the agency of volcanic intrusions.

Next to coal, sulphur is probably the most valuable mineral product of Alaska. It is found in many of the hot and mineral springs, and near the craters of a number of volcanoes. Nitre also occurs. Petroleum is found on the surface of a lake near the Bay of Katmai.

Gold, silver, and copper occur in limited quantities, and white marble of excellent quality is obtained near Sitka.

Lead, iron, graphite, and kaolin, are other minerals known to occur in small quantities. Mr. Dall says,[1] "Wild and exaggerated stories have found a place, even in official documents, in regard to fossil ivory. This is not uncommon in many parts of the valleys of the Yukon and Kuskoquim. It is usually found on the surface, not buried, as in Siberia; and all that I have seen has been so much injured by the weather, that it was of little commercial value. It is usually blackened, split, and so fragile as to break readily in pieces. A lake near Nushagak, the Inglutálik River, and the Kotto River, are noted localities for this ivory. It has also been found on the shores of the Kotzebue Sound and the Arctic coast.

"Ice has long been an article of trade with the Russian-American Company. . . . The first cargo was sold for $75 a ton. It was soon found that it was im-

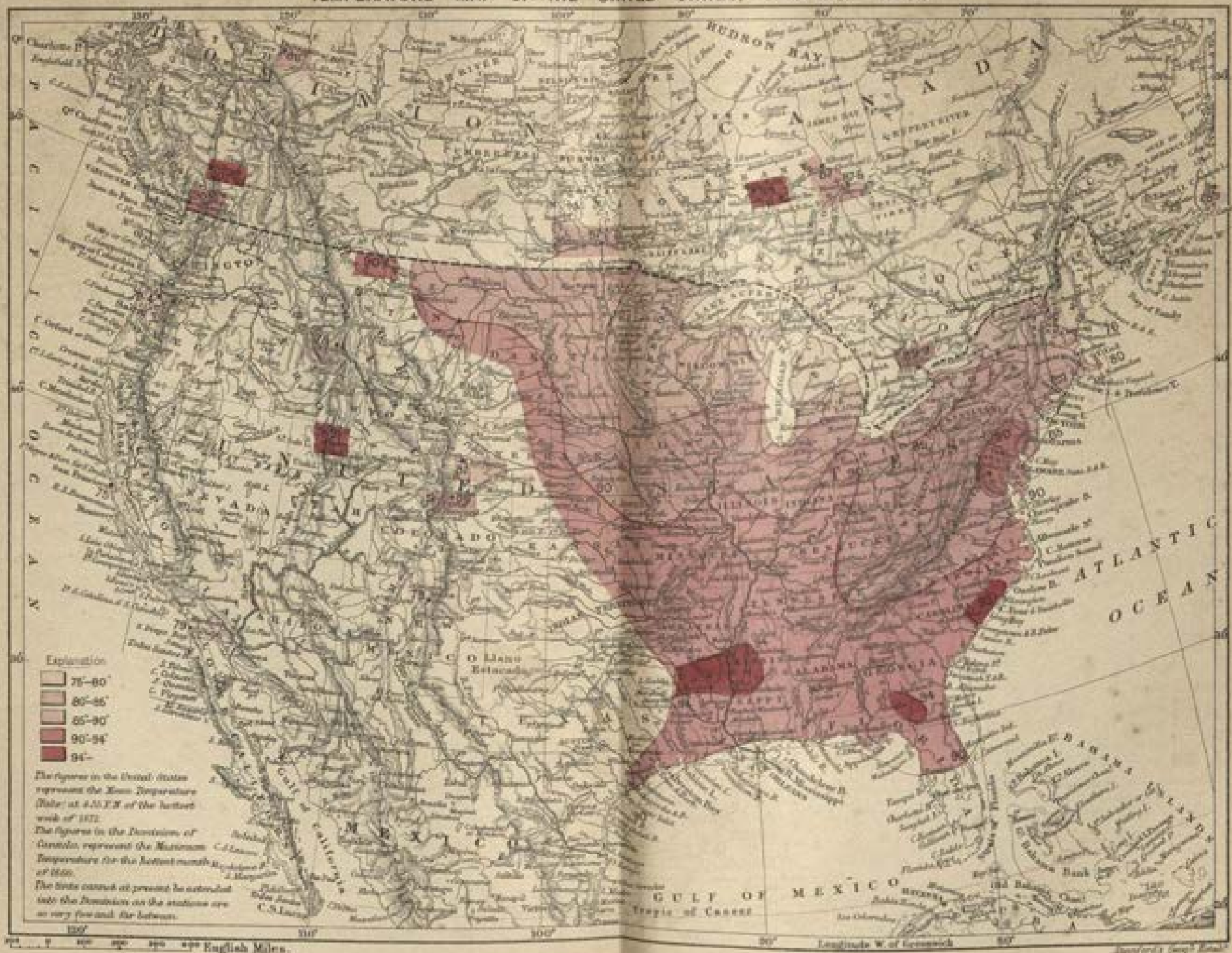
[1] *Alaska and its Resources*, p. 479.

possible to procure ice of good quality or in sufficient quantities in the latitude of Sitka. The establishments were therefore removed to a small island near Kadiak, where they still remain. At various times vessels have loaded with ice from several of the glaciers to the southward. The value of the ice imported into California in 1868 was $28,000. The demand for it has not greatly increased of late years, yet it seems as if, when once introduced into Mexican, South American, and Asiatic ports, that a profitable trade might be carried on. At present ice is taken from New England to India and China, a much greater distance, requiring a longer voyage through hot latitudes, and of course necessitating a large waste while on the way."

TEMPERATURE MAP OF THE UNITED STATES, GREATEST COLD.

London: Edward Stanford, 6 Charing Cross.

TEMPERATURE MAP OF THE UNITED STATES, GREATEST HEAT.


HUDSON BAY
BRITISH AMERICA
ATLANTIC OCEAN
GULF OF MEXICO
MEXICO
Tropic of Cancer
Explanation
75°–80°
80°–85°
85°–90°
90°–94°
94°–
The figures in the United States represent the Mean Temperature (Noon) at 4.35 P.M. of the hottest week of 1872.
The figures in the Dominion of Canada, represent the Maximum Temperature for the hottest month of 1870.
The lines cannot at present be extended into the Dominion as the stations are so very few and far between.
English Miles.
Longitude W. of Greenwich

London: Edward Stanford, 55 Charing Cross.

PART II.

THE DOMINION OF CANADA

AND

NEWFOUNDLAND.

BY

ALFRED R. C. SELWYN, F.R.S.

THE DOMINION OF CANADA,

AND

NEWFOUNDLAND.

CHAPTER I.

THE COASTS.

1. *Boundaries and Area.*

THE Dominion of Canada embraces all that part of North America lying between the Atlantic, Pacific, and Arctic Oceans, north of the United States of America, except Alaska, and all the islands off these coasts, except Newfoundland, which has not yet entered the confederation, and the small islands of St. Pierre, Miquelon, and Langley, lying south of Newfoundland, the sole possession of France in North America.

It extends from the 53d to the 141st meridians, and from the 42d to the 70th parallels, north latitude.

The superficial area is, in round numbers, 3,500,000 square miles, out of which seven provinces have been constituted, representing about one-third of the whole, one district, Keewatin, covering 395,000 square miles; the remainder is still held as Territories. These divisions and Territories are as follows :—

Provinces.[1]	Superficies in Square Miles.	Population, Census 1881.	
		Aborigines.	Other Races.
1. Nova Scotia	20,907	1,401	440,572
2. New Brunswick	27,174	2,125	321,233
3. Prince Edward Island	2,133	281	108,891
4. Quebec	188,688	7,515	1,359,027
5. Ontario	101,733	15,325	1,923,228
6. Manitoba	123,200	6,767	65,954
7. British Columbia	341,305	25,661	49,451
Territories—			
1. North-West Territories, including Labrador, District of Keewatin, and Great Prairie Territory to Rocky Mountains	2,373,490	45,472	56,446
2. Islands in the Arctic Ocean, and in Hudson Bay	310,000	4,000	...
3. Newfoundland[2]	42,000	None.	146,536[3]
Total area	3,530,630	108,547	4,471,338
		Total Population	108,547 4,579,885

Since the above was in type, four Districts have been established in the Prairie Section, by Order in Council of 8th May 1882, as follows:—

1. ASSINIBOIA, containing about 95,000 square miles, is bounded on the south by the international boundary, on the east by the western boundary of Manitoba, on the north by the 9th correction line, Dominion Lands System surveys, near 52d parallel; on the west by a line dividing the 10th and 11th ranges townships, numbered from the 4th initial meridian, Dominion Lands System.

2. SASKATCHEWAN, containing 114,000 square miles, is bounded on the south by Assiniboia, on the east by Lake Winnipeg and Nelson River, on the north by the 18th correction line, survey system, and on the west by a continuation northward of the western boundary of Assiniboia.

3. ALBERTA, about 100,000 square miles, is bounded on the south by the international boundary, on the east by Assiniboia and Saskatchewan, on the west by British Columbia, and on the north by the 18th correctional line, near the 55th parallel.

4. ATHABASCA, containing about 122,000 square miles, is bounded on the south by Alberta, on the west by British Columbia, on the east by a line between the 10th and 11th ranges townships, already mentioned, until that intersects Athabasca River, then by that river and Athabasca Lake and Slave Lake to the 32d correction line, which forms the northern boundary of the district and is near the 60th parallel.

Saskatchewan district includes nearly the whole main Saskatchewan and a part of South Saskatchewan, and contains such well-known places as Battleford, Carleton, and Prince Albert. The forks of the Saskatchewan, where the Press Colonisation Company is located, are almost exactly in the centre of the district.

Assiniboia includes Qu'Appelle, South Saskatchewan, and Souris Rivers, and contains Fort Pelly, Fort Ellice, Touchwood Hills, etc.

Alberta includes the Battle, Bow, and Belly River countries.

Athabasca takes in the celebrated Peace River district.

[1] These statistics are taken from the official returns of the Census for 1881.

[2] Here stated for reference as a part of British North America, although not united to the Dominion.

[3] Census, 1869.

The natural geographical divisions, according to the basins of the river systems, are :—

1. The Northern or Arctic coast, with its archipelago of islands.

2. The Eastern, or St. Lawrence Basin, covering the provinces of (1) Nova Scotia, (2) New Brunswick, (3) Prince Edward Island, (4) Quebec, (5) Ontario.

3. The Central, or Hudson Bay Basin, embracing (1) the East Main, (2) the District of Keewatin, (3) the Province of Manitoba, (4) The Prairie section, with rivers draining eastward to Hudson Bay.

4. The North-Western, or Mackenzie River Basin, north of 60° N. latitude.

5 The Western, or Pacific coast, represented by the Province of British Columbia, with Vancouver and Queen Charlotte Islands.

This vast territory, occupying nearly one-half of the continent, and second only to Russia in area, is bounded on the east by the Atlantic Ocean, Davis Strait, and Baffin Bay; on the west by the formerly Russian but now United States Territory of Alaska, and by the Pacific Ocean; on the north by the Arctic Ocean, and on the south by the United States of America.

This latter boundary, starting from the Atlantic seaboard, commences at the mouth of the St. Croix River, which empties into the Bay of Fundy, then follows this river and Lake Chiputenticook, and passes due north until it strikes the St. John River; thence by that river and one of its western branches it reaches the watershed between the St. Lawrence and the Atlantic, which it follows by a very tortuous south-westerly course to the 45th parallel of north latitude, in longitude 71° 30′ west; thence by this parallel it passes westward to the St. Lawrence, and along mid-channel of that river, and of the Lakes Ontario, Erie, Huron, and the main portion of

Superior, to the mouth of Pigeon River; thence by it and Rainy River it gains the north-west angle of the Lake of the Woods; thence it follows the 49th parallel of north latitude to the Gulf of Georgia, and thence passes by the Strait of Fuca to the Pacific Ocean. The length of this frontier line from ocean to ocean is 3000 geographical miles, 1400 miles being a water line, by river, lake, and sea, and 1600 miles a boundary by land.

In looking at a map of North America the first impression produced on the mind of a geographer respecting the area embraced within the above-described boundaries would be, that a territory as large as Europe, embraced between the same parallels of latitude, warmed by the same sun, and similarly situated with respect to the oceans, must possess vast tracts of land valuable for agricultural purposes,—must, in fact, be not much unlike Europe in climate and soil. The geographer would picture to himself great rivers and lakes of the purest waters, frequent summer showers, extended forests, and prairies of luxuriant grasses, because he is accustomed to find these in similar positions on the eastern continent, and his impressions would be fully supported by the facts. The forests and grassy prairies are the fruits of the heat and humidity of the summers, as the desert areas to the south between the Mississippi and the Pacific are the result of the normal conditions of climate and the absence of summer rains. And though large areas of the northern and north-eastern Territories of the Dominion are sterile, through the cold, yet the prolific fisheries off the coasts of these sterile portions are to a great extent a compensation for the barrenness of the soil, as this broad ocean border is more valuable than the most fertile lands. Its annually self-raised crops, independent of the vicissitudes of climate, need only to be harvested; while on and around the desert areas of the United States, minerals

constitute the only redeeming feature, in which the barren northern lands of the Dominion are in all probability equally rich.[1]

In 1881 Sir Alexander Galt, G.C.M.G., High Commissioner for Canada, stated before the Colonial Institute, in the following eloquent manner, the extent of the Dominion :—" Let me now very briefly endeavour to convey to you some partial idea of the magnitude of the trust that has been assumed by Canadians in undertaking the colonisation and Government of the northern half of the continent of North America. Picture to yourselves a domain nearly as large as Europe, stretching from the Atlantic to the Pacific Ocean, with its southern extremity in the same latitude as the south of France, and its northern boundary along the shores of the Arctic Ocean. Possessing the finest forests in the world, widely-spread coal-fields, most extensive and productive fisheries, watered by the most remarkable natural distribution of lakes and rivers, enriched with all varieties of minerals, and now known to possess an enormous area of fertile prairie-lands destined to become the future granary of England, —this vast country reaches, as the crow flies, from ocean to ocean, 4000 miles, with an area south of the latitude of St. Petersburg of at least 2,000,000 of square miles capable of cultivation, and of which fully one-half produces every crop grown in Great Britain. The Dominion of Canada, thus roughly sketched, is naturally divided into three great divisions—the Atlantic, the Central, and the Pacific. The Atlantic division is that which comprehends the older settled provinces of Nova Scotia, Prince Edward Island, New Brunswick, Quebec, and Ontario. It contains almost the entire present population of the Dominion, about 4,000,000, and has, until very recently, been the only part of the British posses-

[1] *Climate, etc., of Canada*, by J. B. Hurlbert, M.A., LL.D. 1872.

sions in North America to which emigration has been directed. It may be described as the forest section of Canada, and stretches from the Atlantic to the head-waters of the great river St. Lawrence, west of Lake Superior. The Central, or prairie division, containing the new Province of Manitoba, extends from the densely-wooded Atlantic region to the Rocky Mountains. Commencing with the valley of the Red River, of unsurpassed fertility, the prairie extends westward over a gently undulating country, clothed with the most luxuriant grasses and beautiful flora, for a distance of 1000 miles to the base of the Rocky Mountains, by a varying width of from 400 to 600 miles. This magnificent district, watered and rendered accessible in its eastern section by the great Winnipeg and Manitoba lakes, is in its central and western portion traversed by the mighty river Saskatchewan, with 1500 miles of steamboat navigation, and fertilised by many beautiful tributaries issuing from the recesses of the mountains. With some comparatively insignificant exceptions, the prairie division of the Dominion contains probably the largest continuous tract of country in the world adapted to the growth of wheat and other cereals, and peculiarly fitted also for cattle-raising, especially on the western plateau, where cool and abundant water is combined with an exceptionally moderate climate. The Pacific section, known as British Columbia, comprehends the volcanic region west of the Rocky Mountains to the Pacific Ocean, with the magnificent Island of Vancouver. Possessed of a climate much more temperate than that of Canada proper, British Columbia has a large extent of land fitted for agriculture; while the mountain ranges which traverse the country are replete with minerals of every variety, and are no doubt quite as rich as the similar districts of California and New Mexico. Gold to the value of

eight millions sterling has already been extracted from the gravel washing alone, without the introduction of scientific mining. Vancouver Island has by far the larger part of the coal trade of the Pacific coast, from Bering Strait to Cape Horn; her coal-fields are inexhaustible in extent, and the quality of the coal excellent. This must make British Columbia the future emporium of the China and India trade; while its importance in connection with the naval supremacy of England in the Pacific Ocean can scarcely be exaggerated."

The several coasts may now be described.

2. *The Atlantic Coast.*

From the mouth of the St. Croix River, latitude 45°, longitude 67°, to Cape Chudleigh, 60° 14′ north latitude, 65° 25′ west longitude, at the entrance of Hudson Strait, the Atlantic seaboard of the Dominion abounds in deep indentations, forming magnificent harbours and sheltered bays, teeming with the finest description of fishes, and presenting a shore line of probably more than 10,000 miles in length. The Bay of Fundy, 170 miles long, and from 30 to 50 miles wide, with its prolongations, the Chignecto Channel and the Basin of Mines, nearly separates the provinces of Nova Scotia and New Brunswick. It is characterised by its rushing tides, causing a rise and fall of from 12 to 70 feet. Its southern shore, from Cape Blomidon to Brier Island, is lined by a lofty mural precipice of black basaltic rocks, from 300 to 600 feet in height, against which the impetuous tides dash with great fury. The Digby Gut, a narrow passage barely 700 yards in width, through this wall of rock, affords ingress to the beautiful Annapolis Basin. On the north-west are the harbours of St. John and Lepreau, while from St. Mary

Bay, on the south-west, to the Gut of Canso, the whole coast is lined with excellent harbours, easy of access, capacious and well sheltered. Conspicuous amongst them is that of Halifax, the Atlantic naval station of Britain, and the winter port of the Dominion, one of the finest on the Continent, easily accessible, and capable of accommodating the largest vessels in the world.

To the south-west of Halifax are the harbours of Lunenburg, Liverpool, Shelburne, and Yarmouth, and to the north-east Torbay, Whitehaven, and Canso, the latter at the extreme eastern point of the mainland of Nova Scotia, while immediately to the north lies the magnificent expanse of Chedabucto Bay, with Milford Haven at its head. This bay forms the southern entrance to the Gut or Strait of Canso, to the north-east of which lies the island of Cape Breton, only second to Nova Scotia proper in the number and excellence of its harbours. Among these are Sydney and Louisbourg, the former the site of a prosperous town and coaling station, the latter, although now only a fishing hamlet, at one time the stronghold of France on the Atlantic coast. Here, also, is the beautiful *Bras d'Or*,—"arm of gold"—an almost tideless salt-water lake, penetrating, with numerous bays, channels, and straits, upwards of fifty miles into the island. Its depth varies from twelve to fifty fathoms. The entrance is divided into two passages by Boularderie Island; the southern passage is twenty-five miles long, and from a quarter to three miles wide, but is not navigable for large vessels; the northern is about the same length, and from two to three miles in breadth, with sixty fathoms of water. Its southern end is only nine miles from the Strait of Canso, and on the western side it has been connected by a ship canal with St. Peter Bay, only half a mile distant, thus bisecting the island.

This great "Arm of Gold," with its charming coves

and sandy beaches, picturesque villages, fertile fields, and substantial homesteads, with beautifully-wooded hills rising in the background, whether seen in the bright verdure of early spring, in the rich luxuriance of summer, or decked with the glorious tints of autumn, presents a greater amount of lovely coast scenery than can be found within the same compass in any part of America. It is traversed by commodious steamers, and an excellent road runs almost the entire length of its deeply-indented shore-line. Its beauties once seen can never be forgotten, and that it is so little known or visited by travellers is a remarkable fact.

To the north the Strait of Canso opens into the south-east angle of St. George Bay, another deep indentation of the coast, sixty miles in circumference. The entrance to this south-easternmost bay of the great St. Lawrence Gulf is about twenty miles wide between Cape St. George, a bold granite headland on the mainland of Nova Scotia, and Port Hood, latitude 46° north, the extreme western point of Cape Breton Island. At its head is the fine harbour and thriving town of Antigonish.

The principal entrance to the St. Lawrence Gulf is fifty-nine miles wide between Cape Ray in Newfoundland and Cape North in the Island of Cape Breton, latitude 47° 20′ N. and longitude 59° 50′ W. The Gut of Canso to the south, about one mile wide, and the Strait of Belle Isle to the north, fifteen miles wide, are the only other entrances. Exclusive of that portion lying west of Anticosti Island, this gulf may be described as a pear-shaped area, having an extreme length, from Belle Isle on the north-east to Baie Verte on the south-west, of 550 miles, and an extreme width, from Gaspé on the west to Cape Breton on the east, of 200 miles. Its superficial area is about 80,000 square miles, surrounded by the

provinces of Nova Scotia, New Brunswick, Quebec, Newfoundland, and the south coast of Labrador.

Within it are the Magdalen Islands, and the beautiful, fertile, and thickly-settled island province of the Dominion, Prince Edward; and between exactly the same parallels of longitude, but 130 miles farther north, is the somewhat larger island of Anticosti (3845 square miles), with a population of only 600 persons.

On the southern shores of the gulf, separated from Prince Edward Island by Northumberland Strait, varying from ten to twenty miles in width, there are also many excellent harbours and roadsteads. Pictou and New Glasgow, the shipping ports for the coal-fields of Nova Scotia, and Baie Verte, the outlet of the proposed canal connecting Cumberland Strait and the waters of the Bay of Fundy, and Shediac, the connecting station of the Intercolonial Railway with the Prince Edward Island steamers.

Leaving Northumberland Strait the coast continues in a northerly direction, and passing the fine harbour and estuary of the Miramichi River, noted for its export of timber, we come to the entrance of the beautiful Baie des Chaleurs, ninety miles long, and fifteen to twenty miles wide. It is everywhere deep and well sheltered, and the numerous rivers falling into it afford the finest salmon fishing in the world. The bold peninsula of Gaspé, seventy to eighty miles wide, terminating at Cape Rosier, separates it from the estuary of the St. Lawrence River, which, immediately west of the island of Anticosti, 350 miles below the city of Quebec, is seventy-five miles in width.

From Anticosti and the Mingan Islands to the eastern limit of the province of Quebec, at the Strait of Belle Isle, a distance of 300 miles, the north shore of the gulf presents a stretch of inhospitable rocky coast, indented

by bays and inlets, and fringed with a multitude of islands.

North of the Strait of Belle Isle the coast-line of the continent turns north-west to Cape Chudleigh, or Chidley, and forms the north-eastern shore, nearly 600 miles in length, of the great triangular peninsula of Labrador and East Main, lying between the Gulf of St. Lawrence and Hudson Bay. The continental outline is, however, prolonged in the same direction by groups of large islands, far within the Arctic circle. About 250 miles from the Strait of Belle Isle the great inlet called Esquimaux Bay, Invertoke Bay, or Hamilton Inlet, in latitude 54° 23′ N., longitude 57° 25′ W., is by far the largest of the many inlets which indent that part of the coast. At its entrance it is upwards of thirty miles in breadth, thence decreasing until at the port of Rigoulette, about fifty miles from the sea, it is reduced to about a mile in width, after which it again expands, and about ninety miles from the sea forms a magnificent salt-water lake, upwards of twenty miles wide and fully thirty in length. At the western extremity of the lake it again contracts to a small width for a short distance, above which it forms another lake, about seven miles wide and twenty long, where the head of the inlet is reached. Its total length may be taken at 150 miles, and its mean breadth about fifteen miles, exclusive of two large arms that join it in the neighbourhood of Rigoulette, the one running to the south-east about forty miles, and the other having a course nearly parallel to the main bay, and a length of sixty miles. Including these arms, the surface covered by its waters may be taken at about 1700 square miles.

Many islands lie off the entrance of the bay; they are also very numerous within it. Being of all sizes, from the little rock hardly large enough to stand upon,

to the large island many miles in extent, they add, in a great degree, to the danger of navigating the bay in foggy weather, for there is generally deep water close alongside of them.[1]

Between Hamilton Inlet and Cape Chudleigh there are numerous good harbours, besides those on which are situated the Moravian missionary settlements of Hopedale, Zoar, Nain, Okkak, Hebron, and Ramah.

3. *The Shores of Hudson Bay.*

This large inland sea, appropriately styled "the Mediterranean of America," lies in the centre of the Dominion of Canada, and stretches half-way across the widest part of the continent.

It consists of the bay proper, or central portion, and two large arms, that of Fox Channel on the north, and James Bay on the south. The eastern shore, or "East Main," as it is called, 80° west longitude, forms the western shore of the Labrador Peninsula.

The western shore of Hudson Bay, 95° west longitude, lies contiguous to the great north-west prairie section of Central Canada. The northern end of the bay proper is in latitude 62° N., where Hudson Strait enters at the north-eastern side, but the northern limit of Fox Channel is 70° north latitude. To the south, James Bay has its entrance between Cape Henrietta Maria on the west and Cape Jones on the east, both being in about 55° north latitude, while the extreme southern end of the bay is in 52°, or 3° farther south.

Including its two arms, Hudson Bay has an extreme length north and south of about 1300 miles, and a width across the bay proper of about 600 miles.

[1] *Notes on Esquimaux Bay and the Surrounding Country*, by W. H. A. Davies, 1842.

The basin drained by this great inland sea is estimated at 2,700,000 square miles, and includes the magnificent prairie section of the Dominion, bounded on the west by the Rocky Mountains.

The geography of the bay and strait is not well known. It has never been fully explored, although the Hudson Bay Company have navigated it annually for over 200 years, and it is only lately since the country has been transferred to the Dominion of Canada that regular surveys of its shores have been commenced.

The narratives of Coats[1] and Chappell,[2] as well as the Government Report on the navigation of Hudson Bay,[3] have been consulted, but the latest information has been derived from the Reports of the Geological Survey of Canada,[4] under the direction of A. R. C. Selwyn, LL.D., F.R.S. These explorations, however, as yet only cover the south and east portions of the bay and the immediate vicinity of Forts Churchill and York.

Hudson Strait is about 400 miles in length, with an average width of about sixty miles, the narrowest part, about half-way between the Atlantic and Hudson Bay, being twenty-two miles in width. On the north is "Baffin Land," on the south the northern shores of the Labrador and East Main Peninsula.

The Atlantic mouth has, until lately, been described as lying between Resolution Island on the north, 61° 15′ north latitude, and Cape Chudleigh on the south, 60° 14′ south latitude. It appears, however, that the inlet named Frobisher Bay, according to the reports of the

[1] *Geography of Hudson Bay.*

[2] *Narrative of a Voyage to Hudson's Bay in his Majesty's Ship "Rosamond,"* by Lieut. Chappell, R.N. London, 1817.

[3] *Navigation of Hudson Bay*, by J. S. Dennis, Surveyor-General to the Federal Government of Canada, 1878.

[4] *Geological Survey of Canada*—A. R. C. Selwyn, F.R.S., F.G.S., Director.

whalers who visit this coast, forms a part of Hudson Strait, and is only divided from it, between Resolution Island and North Bay, by a chain of islands, of which Resolution Island is the most easterly, and the Savage Islands the most westerly. The different charts consulted agree in marking this shore as a *Meta Incognita*, although some lay down Frobisher *Bay*, and others Frobisher *Strait*. Newton's Terrestrial Globe of 1881, as well as the Dominion Maps, lay it down as a strait.

According to Becher's[1] chart, Resolution Island is ten miles from the northern mainland; and although it is known that the group of Button Islands lie off Cape Chudleigh, still, so little have these coasts been explored that it is not known whether Cape Chudleigh is on an island or on the main shore.

The centre of the channel is about 61° north latitude. The chief islands at the western entrance are King Charles, Nottingham, and Salisbury Islands. The Digges Islands lie off Cape Wolstenholme, at the north-west point of East Main, while Mansfield and the southern Southampton Islands lie west of the western mouth.

Prince Henry foreland is worthy of notice as a striking headland on the south shore, and about midway in the strait.

The large Bay of Ungava, 150 miles across, lies on the south shore near the eastern entrance; and almost opposite to it, on the northern shore, is North Bay, a long shallow bay, into which Frobisher Strait opens.

The shores have never been examined, but appear to be high, rocky, and barren, with many islands and sheltered bays, and the water deep, exceeding at mid-channel sometimes 300 fathoms. The western entrance, about the 75th meridian, is seventy-five miles in width.

[1] Becher "On Voyage of Martin Frobisher," Royal Geographical Society, 1842.

The principal islands on the north shore, named by Coats, are Resolution Island, Snowyland, Saddleback, Middle Savage Islands, Gray Goose Island, and many others; but these names are not to be relied on.

On the south shore are the Button group, Akpatok Island, a large bold island in Ungava Bay, Green Island, Long Island, and, as supposed, many others.

There are two large rivers emptying into Ungava Bay,—Whale River and the Koksoak or South River; of these very little is known. The George River, probably about forty miles in length, forms the boundary between East Main and Labrador.

The tides in Ungava Bay rise to thirty or even forty feet, and the currents rush with much force, particularly at the narrows and at the mouth.

The Hudson Strait current is regularly east from Fox Channel, carrying much ice when the arctic ice is moving southward.

Roving bands of Esquimaux frequent the shores of the strait during the summer months; but otherwise they are uninhabited. The region including Fox Channel, which is bounded on the west by Melville Peninsula and Southampton Island; on the east by Baffin Land; on the north by Cockburn Island; and on the south by Hudson Bay proper, may be described generally as icy, part of it being within the arctic circle. The extreme length of Fox Channel is about 350 miles, with an uniform width of about 100 miles. The large island of Southampton lies at its mouth, about opposite to Hudson Strait, and Wager Inlet opens into it on the western shore, about 66° north latitude, 87° west longitude.

Very little is known of Fox Channel, except from the account of Fox, or of the shores, except from the reports of Hearne.

James Bay, at the southern end of Hudson Bay, is

eighty miles in width at its mouth, and has a pretty uniform breadth throughout its entire length, which is about 300 miles. The islands of Agoomska and Charlton lie towards the lower end. The waters of James Bay are muddy, and near the shore shallow and brackish. The coasts are low, and slightly undulating. They are well wooded, and some of the spruce timber is of fair size. Passing northward, a strip of land, several miles in width, along a part of East Main, appears suitable for agricultural purposes. In approaching Cape Jones, the larger trees begin to retire from the shore; and the woods are interspersed with park-like openings, which give the country a pleasing and romantic appearance. The coast is fringed with a labyrinth of low islands of different sizes, consisting of rounded rocks *in situ*, boulders, shingle, gravel, and sand, and outside of these are many reefs of the same materials, only bare at low tide.

The southern shore of James Bay, as well as the region on the west, as far as Nelson, enjoy a milder climate and a richer soil than is found in the corresponding latitude on East Main. This difference in climate, referred to elsewhere, is supposed to arise from the influence of the warm westerly winds, and it produces a marked effect on the vegetation. Summer frosts are avoided, and the more hardy grains, as well as root crops and ordinary garden vegetables, thrive.

Proceeding northward along the western shore, the soil and climate are favourable to the coarser grains, until the Nelson River, about 57° north latitude, is passed; while as far as the Churchill River crops may be grown.

The following rivers falling into Hudson Bay, on the western shore, are here simply named, as those that are known will be specially described farther on. They are the Dubaunt, falling into Chesterfield Inlet, in latitude

64° 30′ north, 100° 40′ west,—the inlet is 250 miles long, and twenty-five miles wide; the Seal, North, Churchill, Nelson, Hayes, Severn, Weenisk, Trout, Equan, Attahwahpiskat, and Albany.

At the southern end the Moose, Massiwaiba, Oggotika, Matta-gami, and Abittibe.

On the East Main shore, proceeding northward, the Harrikanaw, Noddawai, Rupert, East Main, Big River, Seal, Whale and Little Whale, Nastapoka, and Langlands, with many others still unnamed.

North of Cape Jones the coast is described in the report of the Geological Survey of Canada for 1877-78. The water there becomes as clear as that of the Atlantic Ocean. A change in the marine fauna is also noticed—new species of fishes and a number of the lower marine animals, which had not been observed farther south, make their appearance, while others which had been previously seen now become abundant.

The shore begins to be higher and bolder, and these characteristics increase as we go north. The hills near the coast rise to a height at first of a few hundred feet, and then to 1000 and even 2000 feet above the sea. Instead of the gently undulating outline which has hitherto prevailed, the shore becomes rugged and precipitous.

The islands are bold and lie in regular succession. They vary in size from mere rocks to thirty miles in length. Most of the larger ones have a crescent-shaped outline, the convex side facing the mainland, and generally presenting a cliff of greater or less height, while the top of the island slopes to the west and dips at a gentle angle under the sea.

Tory Island, about thirty miles in length, lies off Cape Jones. A short distance ahead is Long Island Sound, full of reefs.

The Manitounuck chain of islands, forty miles in length, begins opposite to the mouth of Great Whale River.

The Manitounuck Sound, inside of this chain, is narrow and completely sheltered from the open sea, and looks something like a river in sailing through it. The Nastapoka chain begins opposite to the mouth of Little Whale River, and runs for ninety miles at a distance varying from ten and a-half to five miles from the mainland, the intervening water being called Nastapoka Sound.

The Nastapoka and Langlands rivers, which empty into this sound, have each a beautiful fall at the mouth. The Hopewell chain of islands, farther north, lies close to the main shore; the sound of the same name averaging only about one mile in width. At the end of this chain we come to Cape Dufferin, in about 58° 45′ north latitude, the most prominent cape on the east coast of Hudson Bay.

The coast has now become somewhat lower than it was to the south. From Manitounuck Sound, to a point thirty-two miles north of the inlet of Richmond Gulf, rocks similar to the upper copper-bearing rocks of Lake Superior—dolomites, sandstones, and traps—are largely developed.

Richmond Gulf, north of which trees are no longer seen on the coast, is a remarkable sheet of salt water, triangular in outline, and measuring about twenty-five miles from north to south, by fifteen miles from east to west. It is connected with the sea by a gorge a mile in length, but only a few chains wide, cut through the high ridge which lies between the gulf and Hudson Bay.

This gorge is too narrow to allow the gulf to fill up with every rise of the tide, or to empty itself at the ebb to a level with the low-water mark outside. The result is that, with the exception of a few minutes at each turn

of tide, the water rushes out and in through this rocky *cañon*, causing whirlpools and eddies, which are sometimes dangerous to small craft.

The water at this place never freezes, and the locality is much resorted to by water-fowl, seals, and white porpoises, which are numerous in the summer time. The scenery around Richmond Gulf is extremely wild, grand, and picturesque.

Mosquito Bay, an inlet of considerable size, and near the entrance to Hudson Strait, is not described, and has probably never been explored.

On the western coast, about Churchill River, the land is high and rocky; but at York Factory, at the mouth of the Hayes River, latitude 57° 2′ north, longitude 92° 40′ west, it is low and swampy. At the mouth of the Severn it is too low to permit of ships approaching the coast. At Moose Factory, in James Bay, the anchorage is good. In the southern part of this basin many of the well-known timber trees of Canada, including red and white pine, are found. The spruce is the last to disappear as one goes northward, but is suitable for building purposes as far as Fort George on the east and Fort Churchill on the west shore. The tamarac or larch (*Larix Americana*) has the same limits. The balsam fir reaches nearly to Fort George. The Banksian pine is found near York Factory. Of the deciduous trees willows extend farthest north, the balsam, poplar, and aspen coming next. The white birch has the same range as the latter.

The Hudson Bay Company have ten stations or trading posts on the bay, with resident agents. At these points the trade with the interior is carried on, supplies of goods are received from London, and shipments of furs are returned.

The ships visit the bay once a year. Passing from Britain *viâ* the Orkneys, they enter the bay generally

about the middle of July, and leave about the middle of September.

At the mouth of the Churchill River are now standing the ruins of a fort, 100 yards square, with walls seventeen feet thick, originally mounting forty guns. This fort was built by the Hudson Bay Company at an expense of about $120,000, the dressed stone for the front of the walls having been imported from England. It was constructed probably more for the protection of the territorial rights of the Company, which were menaced by the French, than as a protection against the Indians. In 1704, Perouse, the French admiral, demanded its surrender, to which Hearne discreditably acceded.

To the west of Hudson Bay game abounds, and the fur-bearing animals afford supplies to the Hudson Bay Company, who, although they have not now a monopoly of the trade, prosecute it as formerly.

As the navigation of Hudson Bay and Strait is now attracting much attention, the question of the practicability of establishing an ocean steam line for trade and immigration purposes between Europe and the north-west of the Dominion by this route, may be considered.

Assuming that a railway be constructed westward from the western shore of Hudson Bay, as is now proposed, along the valley of the Nelson River, and for which a charter has been obtained, the importance of this route is evident as shortening the distance to the fertile agricultural districts of the great prairie section of Central Canada, as well as that of the transcontinental route. Stretching a tape line over a terrestrial globe, it will be seen that the distance between Liverpool and New York is about ninety miles more than the distance from Liverpool to the Nelson River, and this point is half-way to the Pacific Ocean.

It is further claimed that this northern route, for

climatic reasons, possesses special advantages for the transmission of grains and meats.

The important points to be proved are, that the navigation of this strait and of Hudson Bay is open a sufficiently long season for the purpose of trade and immigration, and is safe.

A very valuable report on the question, prepared by Lieutenant-Colonel J. S. Dennis, Deputy Minister of the Interior, and published in 1878, is a synopsis of the latest information on the subject. The report can only be referred to briefly, but is worthy of attentive perusal.

It is there stated that Professor Hind considers a Canadian Archangel may be established on Hudson Bay, and that with strongly-built steamers, properly handled, and using the magnetic-electric light in the latter part of the season, the navigation of this strait is perfectly practicable during the months of June, July, August, September, and October.

This opinion seems to be confirmed by that of other persons, as well as by facts.

For more than two hundred years, from two to five sailing vessels on an average, frequently with war ships convoying them, have sailed annually from Europe to Port Nelson or other ports in Hudson Bay, and returned with cargoes the same season, *viâ* the only available route, Hudson Strait.

What was practicable for the old-fashioned sailing ships is now rendered comparatively easy in consequence of the great changes which have taken place during the last ten years in the prosecution of the sealing industry, which has established the fact that properly constructed vessels of large capacity are, in skilful hands, perfectly adapted to push their way through ice-encumbered seas.

The difficulty in this route is that of effecting an entrance into Hudson Strait from Davis Strait, for so

soon as the east entrance is passed the navigation is comparatively easy to the westward, since the floe ice, if driven, as it usually is, by the winds to the south shore, leaves the north shore free, and *vice versâ*.

Lieutenant Edward Chappell, R.N., of H.M.S. *Rosamond*, visited Hudson Bay, and in the narrative of his voyage, published in 1817, adverts to the advisability of merchants sending a strongly-built brig into Hudson Strait early in the month of June, so as to reach Cape Saddleback before the Company's ships arrive, with a view to trade with the Esquimaux of those coasts. He states that a vessel intended for this trade should not remain in the strait later than the beginning of October.

This would cover a period of about four months, according to Lieutenant Chappell, for a sailing brig, and with properly found steamers this term might be extended probably two weeks. He further states that it is not to be expected that ships, during their return to Europe from Hudson Bay, will ever meet with loose ice, and that when at York Factory they consequently *undid* all their preparations for sailing among ice.

Robson, in his *Account of Hudson Bay*, considers that a safe passage may often be found through Hudson Strait in the beginning of June, before the ice breaks up in the bay, and is carried by winds and currents into the strait. He argues that the ice at the bottom of the bay, the north ice and the west ice, will not have time to reach the strait, "but that after June all the bay ice commonly reaches it." The beginning of June, therefore, seems to be the likeliest time in which to expect a free passage.

Mr. Davidson, the master of the Hudson Bay Company's ship *Prince of Wales*, informed Sir Edward Parry that, after reaching and leaving the headland called the

North Bluff, lying immediately above the Savage Islands, about the middle of the strait, they seldom met with any very serious obstruction, except from a body of ice which they usually have to penetrate near Charles Island.

Sir Edward Parry states that the ebb-tides which come down the strait are not so strong as the flood-tides which go up it, and that in his second voyage he was twenty-two days in the passage of the strait after entering, and but three days in the return passage.

Lieutenant Chappell was twenty-four days between the entrance and Charles Island, and on his return left York Factory on the 18th of September, and reached Cape Desolation on the 6th of October and the Orkneys on the 19th of the same month.

With steamers like those now engaged on the Newfoundland and Labrador Coast in the seal fishery, the return voyage would probably have been accomplished in thirteen or fifteen days.

The extent to which ice forms in Hudson Bay is not known; but, judging from the statements of Hearne, whose opportunities for acquiring information were excellent, ten miles from the shore may be the extreme limit on the deeper and north-westerly portions. The southern part of the bay and the eastern portion probably freeze over a much larger area than the north-western portion.

The objective point in Hudson Strait, which it is desirable to attain at the earliest possible date in the summer, is North Bluff, in the rear of the Upper Savage Islands, from which place, as already stated, the Hudson Bay Company's ships generally take their departure across the strait into Hudson Bay. Baffin anchored here in 1615. In Parry's chart the Savage Islands are represented as a small group, eleven in number, pro-

tecting the entrance to North Bay, a deep opening in their rear. In his work is a sketch of the largest island, which he examined and described in 1821. The cliffs of the eastern island rise between 400 to 500 feet above the sea, and the highest portion to which Parry ascended is from 600 to 800 feet above the ocean. Here the group is a conspicuous object, and affords anchorage-ground. From this point Parry took his observations on the tides, and on that occasion North Bay in the rear was entirely free of ice.

The great rise and fall of the tides in such a narrow strait gives colour to the statement that ice never forms entirely across it, for it is well known that no agent is so powerful in preventing the formation of ice in northern latitudes as strong and continued tides and currents. Hence the suggestion of Lieutenant Chappell and Robson, that Hudson Strait should be entered early in June, before the ice breaks up in the bay and is carried into the strait, acquires special importance in connection with the shelter afforded by the Savage Islands and North Bay. Here, if necessary, steamers might wait for the moving of the ice in Hudson Bay. Supposing that open water does not exist throughout the winter, or in the early spring, between Mansfield and the adjoining large island, thirty miles distant, it is extremely improbable that at the entrance to Hudson Bay, where the water is deep, ice ever forms a continuous barrier. The statement of Hearne, that in the northern parts ice forms only "several miles" from the shore, is entirely opposed to its doing so, and, conjointly with the great range of the tides, it may reasonably be supposed that the ice seen a month later in the season consists of ice drifting easterly. Captain James alleges that when he wintered in the southern part of James Bay, ice was formed as far as the eye could see. This is very probable, for James Bay, though

much farther to the south, is very shallow, and its waters for miles from the shore are brackish only.

The Hudson Bay Company's ships, between the years 1773 and 1813, according to a table given by Lieutenant Chappell, arrived during the months of July, ranging from the 20th to the 31st, and from the 1st to the 22d of August, and two arrived in September, namely, 2d and 13th of September; but no criterion of the time when the navigation opened can be formed from these dates, as the vessels were old, and were frequently under convoy; and further, no object could be gained by their early arrival at the eastern entrance to Hudson Bay, since one voyage each year to and fro was all that was required by the exigencies of the trade.

As to the dangers arising from ice, Sir Edward Parry states that "the effects to be apprehended from exposure to the swell of the main ocean constitute the peculiar danger of first entering the ice about the mouth of Hudson Strait, which is completely open to the influence of the Atlantic. A very inconsiderable quantity of loose ice is sufficient to shelter a ship from the sea, provided it be closely packed; but when the masses are separated by wind and tide, so as to admit the swell, the concussions soon became too violent for a ship, strengthened in the ordinary way, to withstand for any length of time. On this account it is prudent not to enter the ice without a fair prospect of getting seven or eight leagues within the margin. For the same reason also, when likely to be beset near the sea, it is better to make a ship fast to small than to large pieces, in order to avoid the heavier concussions occasioned by the latter."

The Newfoundland, the Dundee, and the Norwegian sealing steamers, properly protected, push their way into the apparently illimitable fields of ice in March and April

in pursuit of seals seeking the ice, for it is there only that they can capture the seals. There are now twenty-five sealing steamers of large size in Newfoundland waters, and during the past ten years they have nearly driven the sailing craft from this, formerly styled, hazardous enterprise. It is not unreasonable to suppose that at the present day, when ice navigation is so thoroughly understood, not only by the captains of sealing vessels but by steam whalers, the passage through Hudson Strait, successfully accomplished for 200 years by bulky and unwieldy sailing vessels and vessels of war, as well as by whalers, will become an easy problem. The French not unfrequently sent vessels of war into Hudson Bay, and more than once they destroyed the Hudson Bay forts. All these facts show that old-fashioned sailing craft successfully accomplished for nearly two centuries, for the purposes of a limited trade, a supposed obstructed and hazardous navigation, which the interests of a country as large as the empire of Germany now invite us to encounter with the modern protected steamer, the magneto-electric light, and the experience of trained and skilful navigators.

Mr. Horetsky, who resided for several years in Hudson Bay, says that the Hudson Bay Company never lost one of their own vessels until the year 1864, when the *Prince of Wales* and consort went ashore at Mansfield Island, "with studding-sails set."

It appears certain that some of the popular impressions respecting the icy character of Hudson Strait and Bay have arisen from the accounts which have been published from time to time of the climate and coast-line of Northern Labrador, which is not unfrequently neared on entering the strait. The descriptions given by the Moravian missionaries of the dangers attending an approach to that coast, as far north as Hebron, before the month of August, are no doubt truthful pictures of reali-

ties as they appeared for the first time to the eyes of these inexperienced sailors. But the coast-line of Northern Labrador is the unfortunate recipient of the combined effects of no less than three separate arctic or subarctic ice streams. These are the East Greenland ice stream, the Baffin Bay and Davis Strait ice streams, and the Hudson Strait ice stream. All of these ice-encumbered currents meet in the summer on the coast of Northern Labrador, and are the cause of its exceptionally cold climate. The reason why the eastern entrance to Hudson Strait is encumbered in early summer arises from the ice of the combined East Greenland and Davis Strait current sweeping in a broad stream past its entrance towards the Labrador coast, on which it is pressed by the earth's rotation.

The only hindrance to an entrance into and through Hudson Strait, early in June, arises from the obstruction presented by the two ice streams coming from East Greenland and Baffin Bay, down the west coast of Davis Straits. It is reasonable to suppose that these ice streams are less encumbered late in May or early in June than in July.

The strait once entered, the chief difficulty is over; and if entered before the ice comes down, as alleged, from Hudson Bay, Bluff Head may be reached and a new departure taken, as suggested by the authorities quoted.

It is doubtful whether the northern portion of the bay ever freezes "several miles" from the shore, and it remains to be seen whether much, or indeed any, ice does come out of Hudson Bay. It is probable that the ice spoken of as coming from the bay really comes down Fox Channel, as shown by the drift of H.M.S. *Terror*, represented on the Admiralty chart. There are two reasons for supposing that very little ice comes from Hudson Bay. The first is, it would imply the constant occurrence

of strong southerly winds and a considerable space of time to carry the ice from so large a surface as Hudson Bay through the confined channels leading into Hudson Strait, and experience teaches that ice is rarely met with after passing Charles Island, except towards the centre of the bay. Moreover, from the description of the ice met in Hudson Strait, it is largely composed of hummocky or heavy Arctic ice, which comes down Fox Channel from the north. It is more probable that the Hudson Bay ice melts and disappears within the limits of the bay itself. The second reason is, that the early opening of the ice on the west coast of the bay,—admitting the salmon and caplin to the shores in the latter part of June, even so far north as Churchill, and six weeks before the Northern Labrador coast is free from ice,—appears to show that local dissolution is the chief, if not the only, cause of the disappearance of the bay ice, and its remnant is occasionally found in the eddy near the centre of the bay in July. If the bay ice found its way into Hudson Strait, these would be most liable to be blocked up between Mansfield and Digges Islands, but this part is represented to be always clear.

It may, with great propriety, be asked, Why should a patch be found near the centre of the bay? If the bay ice drifts out into the strait, would not the ice under such circumstances be found near Mansfield Island instead of at the centre of the bay? Why does the central patch not follow the stream?

Hence the greater reason for adopting the suggestion of Lieutenant Chappell, and entering Hudson Strait early in June, before the Arctic ice from Fox Channel comes down, as shown by the *Terror's* drift.

At all points of the route through Hudson Strait and the entrance to Hudson Bay, where ice accumulations are met with, the Channel, never exceeding forty-five

miles in breadth, is sufficiently near for telegraphic communication by means of magneto-electric lights from one side to the other, so that instant advantage could be taken of information conveyed respecting the condition of the ice in the early summer. In a tideway where the tides rise at neaps thirty, and at springs forty feet, and where the daily swing of the tides is from twelve to twenty miles, carrying ice backward and forward through that space twice every day, fresh channels are constantly opening, which a steamer can avail herself of, but which are useless to a sailing vessel, except with a fair wind.

The importance of the opening of this route will be understood when a comparison is made of distances.

Port Nelson, on the western side of Hudson Bay, is distant from Liverpool 2941 miles, New York is 3040 miles,—a difference of ninety-nine miles in favour of the Hudson Bay route in the sea voyage.

In inland carriage the great advantage for immigrants, as well as for imports and exports, will be evident.

Between Winnipeg and Liverpool, *viâ* Hudson Bay, there would be a saving of inland carriage, as compared with the route *viâ* New York or Halifax, of about 2000 miles—a consideration which is likely to produce its effects in hastening the completion of the Hudson Bay and Nelson River Railway.

On the transcontinental route there is a saving in distance of over 2000 miles, thus:—

Liverpool to Japan, *viâ* New York and San Francisco, 12,078 miles; Liverpool to Japan, *viâ* Port Nelson and the Canadian Pacific Railway to Burrard Inlet, 9734 miles, or a saving in miles of 2352.

The Port Nelson and Hudson Bay Railway, 400 miles in length, is now being surveyed, the Canadian Pacific road is already built to a point 400 miles west of Winnipeg, and will be carried by the end of the summer

of 1882 to the base of the Rocky Mountains—800 miles distant from the point at present reached. The completion of the line to Burrard Inlet on the Pacific coast, being the difficult portion of the road, will doubtless require four to five years, but may possibly, from the energy of the syndicate now at work, be finished even at an earlier date than is now anticipated.

It is not necessary to enlarge on the imperial and Dominion interests which are affected by these facts, as the figures speak for themselves, and the intelligent man will appreciate their importance on the questions of immigration and commerce.

4. *The Arctic Coast.*

Leaving Hudson Bay, we now follow the northern coast of the continent, skirting the North Polar Sea.

Little as is accurately known of this sea, its discovery and exploration have tasked and developed more skill and heroism than perhaps all the rest of the world; and although Parry, in 1827, by means of sledges reached 82° 45′ to the north of Spitzbergen; Hall, in 1871, attained 82° 16′ in the *Polaris*, by the way of Smith Sound; and Markham in Nares' Expedition reached 83° 20′,—there is still an area round the Pole, estimated at 2,500,000 square miles, which is a blank to geographers. Various opinions are held as to whether this vast area is occupied by an open polar sea, or by a continuance of the archipelago of islands found on its confines. Markham, one of the best authorities[1] on Polar explorations, cites the opinion of Admiral Osborn, that the ice-pack to the north of the American continent is land bound, either by islands, or possibly by a continent of which Lincoln, Ellesmere,

[1] *Threshold of the Unknown Regions.* Clements B. Markham, C.B., F.R.S., London, 1873.

and Grinnell land, to the west of Smith Sound, may form parts. Sir Robert M'Clure appears to hold similar views, but the whole is mere conjecture, based on the appearance of the ice, and the movement of the tides and currents. These currents are eastward, the Pacific currents passing through Bering Strait into the Arctic Ocean, and the arctic current into the Atlantic by Davis Strait.

As will be seen, on reference to a map, the boundary line of exploration to the north of the American continent skirts the coast of the mainland, from Bering Strait to about the 125th meridian, and thence northward around the Parry Islands to Jones Sound, and then follows Smith Sound to 82° 16′, where it ends. It is a curious fact, however, that a wide sheet of navigable water is invariably found during the summer months at the upper end of Baffin Bay, and for some distance within Lancaster and Smith Sounds, although there is a formidable barrier of ice between this "north water" and Davis Strait of 170 to 200 miles in extent. Baffin worked his way through this ice-pack in 1616, and although no man followed him for 200 years, still it is now regularly passed by the whalers in the prosecution of their voyages.

This open water is attended by a somewhat milder climate than is found farther south, and affords encouragement to explorers of yet reaching the Pole by this channel. Parry, it will be remembered, found himself carried southward on the "ice-pack," on which he had started in sledges, faster than he progressed northward; but should the ice on the Canadian side of the Polar Sea be land-bound, the Pole may yet be reached from this side.

In 1832 Ross established the Magnetic Pole at 70° 5′ 17″ north, and 96° 46′ 45″ west.

The only section of the arctic coast tolerably well

known at a distance from the continent, is that which lies to the north-east of British America, now the Dominion of Canada.

This arises from the efforts made since the time of Davis, in 1585, to find a north-west passage, and from the search after the lost Franklin, or later from Polar scientific expeditions. Through these means the coast of the mainland has been determined, and although the north-west passage is found to be practically barred by ice, still geographical as well as scientific knowledge has been extended, and we may now describe this coast, to which these "heroes of the north" have given a location and a name.

The mainland of the Dominion of Canada stretches from Alaska, 140° 30′ west longitude, to Fox Channel in the east, a distance of about 1000 miles. This coast line follows pretty closely the 70th parallel, but is broken by bays and peninsulas, Boothia Felix, at Bellot Strait, 71° 55′ north, 95° west, being the most northerly point.

The coast is generally low and flat, but is in some parts high and rocky. A small range of mountains lies between the mouths of the Mackenzie and Coppermine rivers, and runs parallel with and near to the coast. It is irregular from wide indentations, rather than from narrow inlets, as is the case on a heavy sea-washed coast. This is probably owing to the ice-guard of the solid pack, which skirts the coast at a short distance seaward, as well as to the archipelago of islands to the north.

The principal bays met, in following the coast from west to east, are Mackenzie Bay, at the mouth of the river of the same name, 69° north, 135° west; Erskine Sound, Franklin, Darnley, Duke of York or Coronation Gulf, M'Laughlin, and Boothia Gulf, and the unnamed bay at the mouth of the Back or great Fish River, where it

will be remembered Dr. Rae, in 1859, and later Schwatka, in 1878, found the only relics of the Franklin party.

The capes and peninsulas following the same order, and of which the latitudes and longitudes are only approximately stated, are—Cape Bathurst, 70° 30′ north, 128° west; Kent, 68° north, 107° west; Adelaide, 68° north, 98° west; Boothia Felix, 72° north, 95° west; Simpson, 68° north, 89° west; and Melville, 69° north, 83° west.

The straits alongside the coast, and again following the same direction, are the Dolphin and Union, Dease, Victoria, Franklin, Bellot, Boothia Gulf, Hecla and Fury, Fox Channel and Frobisher or Hudson Strait.

The rivers met in like order are the Mackenzie, named after its discoverer, who sailed down it in 1793, and reached the Arctic Sea.

Two smaller rivers, discovered by Dease and Simpson, are found between the Mackenzie and the Coppermine rivers.

The Coppermine River, discovered by Hearne in 1771, enters the ocean at 68° north, 116° west, but is not navigable.

The Back, or great Fish River, discovered by Back in 1834, has its mouth in the sound south of King William Land, about the 95th meridian.

The archipelago of islands between the 125th meridian and Baffin Bay may be classed in four groups—

The western, consisting of Banks Land and Victoria and Albert Land.

The central, of King William, the Prince of Wales, and North Somerset Islands.

The northern, of the Parry Islands; and the eastern, of Baffin Land, consisting of the vast mainlands of Fox and Cockburn Lands, and several smaller islands.

To the north-east of the Parry Islands, and separated

from Greenland by Smith Sound, and from the Parry Islands by Belcher and Jones Straits, lie the yet undefined Ellesmere and Grinnell Lands. Kane, and afterwards Hall, sailed up Smith Sound, the latter to 82° 16′. Nares in 1876 took his vessels up to Discovery Bay, and one, the *Alert*, wintered in latitude 82° 27′, the highest latitude yet attained by any ship. He explored in sledges the coasts, which trend almost at right angles with Smith Sound, for a distance of 200 miles to the west, and 100 to the east, finding a sea of ancient ice to the north and north-west; and Markham and Parr sledged to latitude 83° 20′ 26″, the nearest point to the Pole yet reached. And here we may be allowed to turn southward to Baffin Land.

Baffin Land stretches from Frobisher or Hudson Strait, 61° 40′ north, to Lancaster Sound, 74° north, a distance of about 800 miles. At Cape Walsingham, 66° north, 60° 40′ west, Baffin Land extends towards Greenland, and forms Davis Strait.

This group is cut by several inlets, connecting Fox Channel and Boothia Gulf with Baffin Bay, but these have never been explored. Cockburn Island, the most northward of the group, is separated from Melville Peninsula by the Fury and Hecla Strait on the south, and from the Parry Islands on the north by Lancaster Sound. Cumberland Sound, a large gulf opening into Davis Strait, lies parallel with and to the north of Frobisher Strait, running north-north-west apparently 150 miles, with an average width throughout the whole length of about thirty miles.

Between Cockburn Island and Boothia Felix Peninsula, with its adjacent North Somerset Island, lies the Gulf of Boothia; and on the opposite or western side of the peninsula, and separated from it by the Franklin Channel, is Prince of Wales Island; while immediately to the south

of Prince of Wales Island is King William Island. These three islands constitute the central group.

The narrow strait of Bellot separates the peninsula of Boothia Felix from North Somerset Island. It will be remembered that the existence of this strait was doubted, and that the island for a long time was supposed to form part of the peninsula. This peninsula is also the last link which intervened in the coast-line exploration between the exploring parties who passed from the east westwardly and those who took the opposite course.

Between Prince of Wales and King William Islands and the western group are the M'Clintock Channel and Victoria Strait. Victoria and Albert Land might be classed as a continent, being almost double the size of Newfoundland, and yet not one-third as large as Baffin Land. It is cut by large and deep inlets or bays. To the westward it is separated by a large strait from the great island of Banks Land.

The northern group of the Parry Islands consists of the following principal islands :—The most easterly, North Devon; and in their order westwardly, Bathurst, Melville, and Prince Patrick, besides numberless small islands.

This region is constantly ice-bound, and the land is almost destitute of vegetation. There are traces in fossil trees of a warmer climate than now exists, but animal life is now almost confined to the waters, which are rich in mammalia and fishes. Navigation is restricted to the midsummer months, and even then it is uncertain and precarious in many of the straits.

At Smith Sound, however, musk ox, reindeer, and game abound, and Kane reports having found groves of trees one foot in diameter. Traces of Esquimaux settlements exist here, and some are supposed to be still located north of Hall's highest point.

Notwithstanding the sterility of the soil and the rigour

of the climate, these northern seas have a commercial value which is not yet fully appreciated. Here is the home and the pasture of the seal, the walrus, and the whale, as well as of the highly-prized table-fish, the cod, the haddock, and the herring. Herein is no stint, and the ever-increasing fleets of the hardy whalers, who annually reap their abundant harvests, prove that the riches of the land may be surpassed by those of the waters. And from the fertility of the sources of reproduction, it may be hoped that here at least the destructive agency of man will be unable to impair the supply.

5. *The Pacific Coast.*

The length of the coast-line of British Columbia has been estimated at about 10,000 miles, a predicate on that of Norway, the latter on actual measurement having been found to have in its indented line thirteen times the length of its coast in a straight line. In point of fact the British Columbia coast is much more deeply indented than that of Norway, some of the inlets being upwards of fifty miles.

From San Francisco, as far as the Strait of Fuca, the coast presents a line remarkably free from indentations; thence northwards, however, it is broken into a perfect maze of inlets, forming in their ramifications countless islands of greater or less extent.

The minute explorations of this extraordinary archipelago by Vancouver in the years 1791-93 have given maps, the accuracy of which, under the circumstances, has excited the admiration of succeeding navigators.

Outside of the archipelago lie two principal islands, Vancouver and Queen Charlotte Islands, divided from each other by a broad sound, and extending from the Strait of Fuca on the south to the frontier of Alaska on the north.

Vancouver Island extends in a north-western direction from latitude 48° 20′ to latitude 51° in length, nearly 250 geographical miles, its greatest breadth opposite to Nootka being about seventy miles.

The shores are boldly picturesque, with many promontories, cliffs, harbours, coves, and beaches. The west coast is cut by arms and inlets, margined by rugged mountains bearing fir, hemlock, and cedar; here and there the shore is skirted by lower wooded hills, among which, and along many streams, small patches of open or wooded flat land are found. There are no inlets on the north or east coasts, but in other respects the above description applies also to them. Near Johnston Strait the shore-line is even more continuously mountainous and abrupt than on the west coast. Farther down the east coast, and also in the south-eastern part of the island, the coast is lower, and the proportion of flat or gently undulating land, good for farming, increases, some of which is open or thinly timbered. The prevailing timber near the coast is the magnificent Douglas fir, which often attains dimensions second only to those of the Sequoia of California and the Eucalyptus of Australia.

Victoria, the seat of government and capital of the province, is situated near the south-eastern extremity of the island, where the adjoining Strait of Fuca is about seventeen miles in breadth. The position of this rising city, both as a distributing point for the province at large, and as a nucleus for foreign trade, is extremely favourable; and the fact of its being the first available seaport north of San Francisco confers on it additional importance.

Esquimault, three miles distant, is an extensive harbour, capable of receiving vessels of the largest size, and is the station of Her Majesty's ships on the Pacific coast. The harbour is eight and a half miles distant from the Race Rocks, and is distinguished by the white

tower of the Fisgard Light, which marks the western point of the entrance. This is a safe and excellent anchorage for ships of any size, and with the aid of the lighthouse the harbour may be entered at any time with great facility; the holding-ground is good, being of a tenacious blue clay. The extent of this fine harbour is about three miles by two miles, with an average depth of six to eight fathoms, and round the whole of the irregular circle described numerous rocky promontories, with outlying islands and gently sloping sandy bays, form the chief feature of the scene. Great natural advantages and facilities exist for the extension of townships and formation of docks, and there is no doubt but that this favoured spot will remain the established headquarters of the Royal Naval Force in the Pacific.

About seventy miles from Victoria, on the eastern or inner shore of the island, is Nanaimo, a small town of local importance, originally established in connection with the coal mines wrought in that vicinity, and around which other interests have sprung up.

Comox and Nelson Districts, about forty miles above Nanaimo, on the eastern shore, are prosperous agricultural settlements; while distant from the former, five and seven miles respectively, are the Union and Beaufort Coal-Mines.

Cowitchan, also an agricultural settlement, is situated between Nanaimo and Victoria, upon a river bearing the same name. Passing Esquimault westward, along the Strait of Fuca, are the settlements of Metchosin and Sooke.

6. *Queen Charlotte Islands.*

The group consists of two large islands and two smaller ones lying in an archipelago of islets. The four principal ones, called Graham, Moresby, North, and Prevos, are divided merely by narrow arms of the sea.

This group is described as the Eden of the North Pacific. The climate is very delightful, caused, in some degree, by the Pacific Gulf Stream that skirts the coast of Japan, and with a speed of eighty miles in twenty-four hours runs north, and washes the coast of British Columbia. These islands are hilly, though not mountainous, the interior is clothed with magnificent forests of the finest timber, and the coasts are indented with inviting harbours.

Along the whole coast-line of the province a perfect labyrinth of islands exists, giving innumerable sheltered roadsteads, and channels teeming, as well as the rivers that empty into them, with salmon, sturgeon, mackerel, cod, herring, etc. British Columbia occupies a commanding position, not only with regard to the trade of the western part of America and the Pacific Islands, but also with respect to India, China, Japan, and other Asiatic countries, and the Australian colonies.

CHAPTER II.

THE MOUNTAINS.

1. *General Features.*

It is in considering the effect of mountains on the physical character of a country, and the material interests of its inhabitants, that we are able to appreciate their importance. The course of the winds influencing temperature, the direction of clouds distributing moisture and causing fertility of soil, the watershed over the plains affording lake and river navigation, the mineral products of the hills, and the soil in the valleys, are all more or less attributable to the character of the mountain ranges. They are important factors in respect to climate, fertility, and commerce.

The mountains of Canada must be regarded as forming a part only in the general orographical system of North America. Their arrangement is simple but vast, and in keeping with the general features of the continent. The coast-line on the Pacific or western side, as well as on the Atlantic or eastern one, takes its form from the two great ranges which exist on the continent. The Rocky Mountain range, on the Pacific coast, is a continuation of the "back-bone" of the South American continent, which starts at Cape Horn, continues through the Isthmus of Central America, traverses Mexico and the United States, and, stretching through Canada and Alaska, ends at the Arctic Ocean, west of Mackenzie River. The portion of

this range in Canada is about 1500 miles long and 400 miles broad, and includes three subdivisions, which run parallel with one another, north and south, known as the Coast, the Cascade, and the Rockies, but usually classed as the Rocky Mountain Range. Although not equal in height to the Alps, the Andes, or the Himalayas, they rise from a wide base to 15,000 feet. This range is the longest in the world, and the most extensive, having its snow-capped peaks, its extensive *cañons* or gorges, its beautiful valleys and forests, as well as its glaciers and cascades, with evidences, in some cases, of late volcanic activity in its heights. Very little is, however, known of the range, as it has never been fully explored, and in Canada the only parts known are the "passes."

The other great range, on the Atlantic coast, known as the Appalachian or Alleghany Range, with its several spurs having distinct names, to which we will refer farther on, stretches from the Gulf of Mexico, on the south, to the most northern parts of Labrador. There are several spurs of this range in the United States, but those in Canada occupy the north and south shores of the St. Lawrence River, and create the basin of that river and of the great lakes connected with it. The range to the south of the St. Lawrence may be said to commence in the Cobequid Hills in Nova Scotia, then to attain their greatest height, of about 4000 feet, in the Shickshock Mountains of Eastern Gaspé, and then, running in the same line as the St. Lawrence, to receive the name of the Notre Dame Range, which, passing through the eastern townships of the province of Quebec, are connected with the Green Mountains of Vermont and the Adirondacks of New York State.

The Laurentides follow the coast-line from Northern Labrador along the north shore of the St. Lawrence, retiring northward from the river at a point just below

the foot of the island of Orleans, and, striking the Ottawa River, continue westwardly north of the Georgian Bay on Lake Huron, then skirt Lake Superior on the north shore, and, gradually losing their height, continue as a table-land towards the Rocky Mountains.

Taking, however, a bird's-eye view of the North American Continent, a vast fan-shaped basin opens out from the narrow isthmus adjoining the Gulf of Mexico, and widens northward to 4000 miles at the Arctic Ocean. In such a view the continuation of the Notre Dame and Laurentides Ranges, which diminish in height westwardly, appear as two cross ridges of table-lands or plateaus, one giving a watershed southward over the United States, the other north towards the Arctic Ocean, between which plateaus the St. Lawrence River escapes eastwardly. A cross ridge again divides the Hudson Bay system from the Arctic one, and directs the course of the Great Mackenzie to the Northern Ocean, whilst the Saskatchewan and associated rivers empty into Hudson Bay.

The geographical sections of Canada, to which we referred in the opening chapter, are thus seen to be dependent on the lie of the mountains and the basins of the watershed.

We now proceed to a description of the several mountain ranges in Canada, following the order from east to west.

2. *The Acadian Highlands.*

Commencing at Cape Canso on the north-eastern Atlantic coast, there extends, in a bold sweep, through the centre of Nova Scotia to Cape Sable on the south-west, a range of highlands which nowhere assume the height of mountains, but form a broad band or axis of rugged country of rounded granite hills, or barren stony flats, interspersed with swamps and lakes, in which the

streams descending to the Atlantic coast, on the one hand, and to the Bay of Fundy, on the other, have their sources. Nearly parallel with this range, and sixty miles inland from the Atlantic seaboard, are the Cobequid Mountains, some of which attain elevations of 1100 feet. This ridge traverses the northern portion of the province from Cape Chignecto, on the Bay of Fundy, to Cape Porcupine, on the Strait of Canso. Its summits, consisting of crystalline, granitoid, and syenitic masses, of more ancient date than those of the Atlantic Highlands, are clothed with a large growth of valuable timber; while in the intervening depressions agricultural products grow luxuriantly.

Between these parallel ranges is a wide and fertile valley embracing the entire length of Nova Scotia proper.

A third parallel range of similar structure, but of greater elevation and extent, traverses Northern New Brunswick, from the boundary of the State of Maine to the Bay of Chaleurs. Its drainage gives rise to all the great rivers of New Brunswick, and it forms, in part, the boundary between that province and Quebec. To the south of it is an extensive plateau of fertile lands, embracing nearly the whole of Southern New Brunswick and a portion of Nova Scotia.

3. *The Shickshock, Notre Dame, and Laurentide Mountains.*

A range of mountainous country rises on each side of the estuary of the St. Lawrence, the Laurentides on the north, and the mountains of Notre Dame on the south. The opposing flanks of these ranges keep close on the margin of the water for a considerable distance up the river. That of the southern range begins to leave the margin in the neighbourhood of Kamouraska, nearly a hundred miles below Quebec, where the river is fifteen

miles wide. Opposite Quebec the range is thirty miles distant from the river, and opposite Montreal about fifty miles, where it enters the State of Vermont to form the eastern limit of the valley of Lake Champlain. From the province-line south-westward the range is known as the Green Mountains and the Alleghanies, and constitutes the Appalachian Chain. The flank of the northern range diverges from the St. Lawrence at Cape Tourmente, about thirty miles below Quebec, and at Montreal is distant from the river about thirty miles. Beyond this it extends up the Ottawa on the north side for about a hundred miles, and sweeps round thence to the Thousand Islands, near Kingston, from which it gains the southern extremity of Georgian Bay, and continues along the eastern and northern shores of Lake Huron and Lake Superior. It then turns up to the north-westward, and, gradually diminishing in height to a table-land, ultimately reaches the Arctic Ocean; the distance of the whole course of the range from Labrador is about 3500 miles.

The southern range separates the tributaries of the river St. Lawrence from those of the gulf, as well as from those of the Bay of Fundy and the Atlantic. The northern range gives the water-parting, separating the tributaries of the St. Lawrence from those of Hudson Bay; but beyond the basin of the St. Lawrence it is traversed by two of the affluents of this bay, the Saskatchewan and the Churchill, the former taking its source in the Rocky Mountains; while still farther on the range again becomes the limit of the Hudson Bay rivers, dividing their sources and those of the Back and other streams for 800 miles from the tributaries of the Mackenzie.

Judging from the facts obtained in Canada, each of these ranges is composed of sedimentary rocks in an altered condition—those of the north presenting the more crystalline character. The rocks of the northern

range are also the more ancient, being of the azoic era; while those of the southern are in part palæozoic.

The strata of both ranges are very much corrugated. In the southern mountains the folds run parallel with the range, and the hills and valleys for the most part coincide with these bearings. Some of the axes have been traced a considerable distance, and though parallel with one another, they do not appear to maintain straight lines, but assume, as they proceed, great sinuous sweeps. Following them from the extremity of Gaspé, they strike into the land with a north-west bearing, which gradually rounds to west in the vicinity of Ste. Anne des Monts and the Chatte. Farther on they by degrees assume a nearly south-west course, and again turn more west for a short distance, after passing the Chaudière; but once more bending to south-west, their course becomes nearly south as they quit the province amid the Green Mountains, beyond which their course has been described by Professor Rogers as being marked by sinuosities of a similar character as far as Alabama. In one part or other of the range, rocks of all the divisions of the palæozoic age, from the Cambrian to the Carboniferous, appear to be involved in the folds; and though in some places there is a want of conformity between the Cambro-silurian and the Silurian, and between the Devonian and the Carboniferous, the axes of the folds are parallel throughout the whole, showing that the forces which produced them continued in operation in the same directions during nearly the whole of the palæozoic age.

In the Canadian part of the range the highest peaks are formed of pre-Cambrian rocks. To these appear to belong the Shickshock Mountains, which, in ascending the St. Lawrence towards Quebec, are the highest that are seen on the south side. The whole of the Gaspé peninsula may be considered a block of table-lands,

about 1500 feet in height, in which the river-courses are deep and narrow excavations. Rising from this, the Shickshock Mountains are a conspicuous range of high lands, extending about sixty-five miles from the east side of the Ste. Anne des Monts to the Matanne. They stand on a breadth of from two to six miles, at a distance of about twelve miles from the St. Lawrence, and rise into points attaining heights of between 3000 and 4000 feet. But, though the highest land, they do not form any part of the water-parting of the peninsula; for the Ste. Anne des Monts, the Chatte, and the Matanne, taking their sources in lower country to the south, cut gorges through them so deep that their channels, where they cross the range, are not more than between 500 and 600 feet above the St. Lawrence. The waters of one branch of the Matanne have their source on the lower land on the north side of the range, and flow south through a profound gap to join the main stream, thus crossing the range twice in their course to the great river. To the south-west the same pre-Cambrian axis reappears, and is continued as a prominent range of high lands through the townships of Buckland, Thetford, Broughton, etc., to Sutton Mountain, 4000 feet, on the Vermont boundary; while rising on its south-eastern flanks are a number of more or less isolated volcanic peaks and pinnacles, exceeding in average altitude the highest portion of the axis of the range. The most noted of them are Owl's Head, the Sugar Loaf, Orford Mountain, 2200 feet, Shipton Pinnacle, Ham Mountain, Broughton Mountain, St. Ronan's Mountain in Buckland, the White Mountains of Coleraine, and other smaller peaks to the north-east.

As in the case of the smaller streams cutting the Shickshock Mountains, the Chaudière and the St. Francis, which are two of the largest tributaries on the south

side of the St. Lawrence, traverse this portion of the range, gathering the chief part of their waters from lands to the south, except near the water-parting, through valleys running with the strike. The valleys of the principal streams do not attain a greater elevation than from 500 to 900 feet above the St. Lawrence. They present but few abrupt cascades, and though no less than sixteen ponds and larger sheets of water are included in the panorama from the top of Orford Mountain, it cannot be said that, on the whole, the Canadian part of the southern range abounds in lakes. Six of the largest of these, with their areas and approximate heights above the sea, are:—

	Feet.	Area, Square Miles.
Memphramagog . .	756	37
Aylmer	795	9
St. Francis . . .	890	12
Megantic . . .	1092	17
Temiscouata . . .	467	24
Matapedia . . .	480	12

The hills, exclusive of the summits of the highest ridge, seldom exceed from 1000 to 1500 feet; and the country connected with the Canadian part of the range, presenting a rolling rather than a rugged mountainous surface, is for the most part—particularly in what is called the Eastern Townships—capable of tillage or pasturage, and will in general be found to constitute a useful agricultural area.

While the corrugations of the Laurentides appear to be more complicated than those of the southern range, they have not yet received the same amount of investigation. It would be hazardous, therefore, to express any very confident opinion in regard to their general bearings, the chief part of which are meridional, or a few degrees removed from it. The plications appear to be sharp and numerous; and as the bearing of their axes would be transverse to the general bearing of the range, while sup-

posed equivalent rock-masses belonging to it are nevertheless found towards both extremes of the province, as well as in intermediate parts, it seems probable that the outcrops of the strata will exhibit a very deeply-serrated or zigzag arrangement in their geographical distribution, and that the bearings of the mountains and valleys will conform to them.

The largest rivers issuing from the Laurentides in Canada are the Ottawa and the Saguenay, the former between 500 and 600 miles, and the latter between 300 and 400 miles in length. They take their sources very nearly together, upwards of 200 miles north-west of the St. Lawrence; and, after running for some distance parallel with it in opposite directions, turn and flow nearly parallel with one another to join it, their distance apart being about 300 miles. Almost all the streams in the intermediate country—the Gatineau, the Lièvre, and the St. Maurice being the largest three—run very nearly from north to south, and it is upon some of those which are tributary to the Ottawa that the axes of the folds have been found to coincide with the rivers; while the Ottawa itself, skirting the Laurentides for a considerable distance in the lower part of its course, cuts the folds transversely. From the upper end of Lake St. John to Chicoutimi, sixty miles in a bearing south of east, the Saguenay appears to run with the strata; but from Chicoutimi to the mouth, seventy miles more in the same bearing, it appears to cut them transversely. For some distance below the Saguenay the streams flow nearly parallel with it, becoming, however, more north and south approaching the gulf. The largest of these rivers are the Betsiamite, the Outarde or Bustard, the Manicouagan, and the Moisie; but what relation their courses bear to the strike of the strata has not been ascertained.

Between Lake St. John and Murray Bay the main

ridge of that part which is cut tranversely by the Saguenay is stated to attain 4000 feet above the sea, while peaks in parallel ridges nearer the St. Lawrence may exceed half that height. Bayfield gives 2547 feet to Mont Eboulemens, between Murray Bay and Bay St. Paul; and farther up the St. Lawrence the highest summits do not appear to exceed 1500 or 1700 feet, though one near the sources of the Muskoka and the Petawahweh probably attains 2300 feet; those on the northern tributaries of Lake Nipissing and the French River are from 1400 to 1600 feet; to the Lacloche Mountains, on the north side of Lake Huron, belonging to the Upper division of the Archean rocks, 1000 feet have been given; and to hills farther north in this part something less; while some of the summits of corresponding age on Lake Superior attain 2000 feet.

As the various heights mentioned belong to points more prominent than the country surrounding them, it may not be giving too low an estimate of the general elevation of the Laurentide Range in Canada to call it from 1500 to 1600 feet. The surface which the range presents is of a mammillated character, its hills being worn by glacial action into round-backed forms, in general thickly clothed with wood, the prevailing trees on the summits being evergreens, in some parts chiefly pine, and in others spruce, while hardwood sometimes abounds on the lower elevations and in the valleys. The valleys are in general not very wide, and many are worn into deep pits, holding ponds and lakes. Some streams, indeed, are nothing more from their sources to their mouths than a chain of such quiet expansions united by short discharging channels. The prodigious number of these sheets of water, great and small, bespangling the whole area, is one of its most remarkable features, and when looked upon as displayed on a map they appear so

scattered at random over the surface as to contradict almost any supposed law of distribution. Some of the clusters, however, that have been examined in connection with their geology are most beautifully explained by the peculiar geographical distribution of the strata, which results from their very corrugated condition, combined with the unequal wear occasioned by the hardness and toughness of some parts and the softness of others. In the Laurentide region a straight line can scarcely be followed in any direction for a great distance without the occurrence of one of these expansions, and it frequently happens that it will present a considerable area even where discharging by a very slender outlet. The profusion in which the lakes exist, with in some instances only a short interval of land between them, though they may belong to different river systems, affords, with the aid of birch-bark canoes, a ready means of passing from one navigable stream to another, in whatever part an explorer may be; and thus, if he is well acquainted with the country, he can reach almost any position he may wish to attain without much deviation from a direct route. Although a large number of the rivers of the Canadian portion of the Laurentides is still unknown, or only partially explored, upwards of 1000 of these lakes are represented on the published maps of the country. It is only a few of them, however, that are sufficiently large to deserve especial mention. The following six are the best known, with their areas and their elevations above the sea:—

	Height. Feet.	Area. Square Miles.
St. John . . .	300 ?	360
Grand Lake . .	700 ?	560
Temiscamang . .	612	126
Keepawa . . .	760	92
Temagamang . .	800 ?	330
Nipissing . . .	639	294

From the opposing flanks of the two mountain ranges which have been described there extends a vast intermediate plain, the limit of which westward is the Rocky Mountains. In addition to six or seven isolated trap mountains in Eastern Canada, varying in height from 500 to 1800 feet (all visible from the hill near Montreal, which is one of them), and the Adirondack Mountains, a nearly isolated mass of Laurentian rocks rising in New York to the height of 5000 feet between Lake Champlain and Lake Ontario, there are few sudden inequalities to break the smoothness of the general surface of the plain, with the exception of abrupt descents through the drift to rivercourses, and an escarpment forming that step in the country which produces the world-renowned cataract of Niagara. The summit of that escarpment is of the middle Silurian period, and, tracing it from west to east, it is known to form the two horns separating Green Bay from Lake Michigan, thence running along the south front of the northern peninsula of the State, which takes its name from that lake and the south half of the Manitoulin range of islands, it reaches Cabot's Head, and composes the chief feature of the promontory separating Georgian Bay from the main body of Lake Huron. From this it constitutes the summits of the Blue Mountains, and, rounding the western extremity of Lake Ontario, it forms St. Catherine Ridge and Queenston Heights. It thence follows at a short distance the south side of Lake Ontario and of the valley of the Mohawk, and sweeps round into the valley of the Hudson. By the addition of terrace above terrace of strata of Silurian and Devonian age, the step farther on rises into the Catskill Mountains, beyond which it becomes entangled in the folds of the Appalachian chain and is lost.

4. *Rocky Mountains.*

Probably no mountains of the same altitude can be so readily traversed as the Rocky Mountain chain, owing to the great breadth of its base and its gentle acclivity. Among the highest known peaks in Canada are Mount Brown and Mount Hooker, the former about 16,000, and the latter 15,690 feet above the level of the sea, lying about 53° north latitude; the general altitude of the range, however, is supposed to vary from 10,000 to 14,000 feet.

This chain in the central and west part of North America commences in New Mexico, in about 32° 30′ north latitude, near Fort Webster. It extends nearly north-north-west throughout the north portion of the continent to the Polar Ocean, terminating west of the mouth of the Mackenzie River in latitude 69° north, longitude 135° west. This range, in connection with the Andes, of which it may be said to be a continuation, forms the longest and, according to Humboldt, the most uniform chain of mountains on the globe.

Somewhat more than half of the entire chain belongs to North America, the name Rocky Mountains being usually applied to that portion only which is comprised within the United States and Dominion of Canada, although the exact limit of this mountain range towards the south can scarcely be said to be determined. The entire length, however, of the chain, following the windings, may be stated in round numbers at 3000 miles.

Among the most remarkable of the numerous passes may be mentioned that leading from the head-waters of the Athabasca to those of the Columbia, between Mount Brown and Mount Hooker, and called the Athabasca Portage. It has a height of 7300 feet, and has only been used by the traders of the Hudson Bay Company as the principal pass into the basin of Columbia.

YALE, ON THE FRASER RIVER (BRITISH COLUMBIA).

To face page 341.

In a minute by the Hon. Joseph W. Trutch, late Chief Commissioner of Lands and Works for British Columbia, it is stated that little has hitherto been done towards the construction of trails or roads across the Rocky Mountains north of the 49th parallel, and that the primitive paths through the various passes of this mountain range, originally tracked out by Indians, and only kept open, year by year, by their travel along them, are still the sole means of communication between British Columbia and the North-West Territory.

Many of these passes are, however, even in their primitive condition, so easy of passage that horses carry heavy loads over them with facility, and through the Vermilion Pass loaded carts have been driven on the natural roadway unimproved by labour.

But although, adds Mr. Trutch, the work of building a road over the Rocky Mountains has yet to be commenced, much has already been effected by this province towards the consummation of the much-desired line of road communication through British territory, between the sea-coast of British Columbia and Canada. In fact, more than one-half (in cost) of this work within the limits of the province is now complete. The Cascade Range of mountains, the great barrier between the sea-coast of British Columbia and its interior districts, which presented a far more difficult engineering obstacle to road-making, and one more expensive to overcome than the Rocky Mountains themselves, has been pierced by two lines of coach road, which, commencing at Yale and Douglas respectively, the limits of steamboat navigation on the Lower Frazer and its tributary, Harrison Lake, unite at Clinton, 136 miles from Yale, on the high-rolling plateau in the interior, from which junction-point the road extends 242 miles farther northwards to Cameronton, in the heart of the Cariboo district, distant altogether 378 miles from Yale.

A branch road, twenty-three miles long, has also been built from the main line, at a point on the Buonaparte River 110 miles from Yale, to Savona's at the lower (western) end of Kamloops Lake, from which place uninterrupted steamboat navigation extends through Kamloops Lake, and up the South Thompson River to the upper (eastern) end of Great Shuswap Lake, a distance of 115 miles, and also up the north branch of Thompson River, which joins the South Thompson at Fort Kamloops, to a distance of eighty-five miles from the latter post.

These roads, constructed at a total cost of $1,339,915 (about £275,000), are of a character very superior to that of public roads in most young countries.

Loads of seven and eight tons are hauled along them by mules or oxen, at an average draught load of 1200 lbs. or 1300 lbs. to each team animal; and the mail coach drawn by six horses travels between Yale and Cariboo at the rate of nine miles an hour.

From the Cariboo terminus of this road, and from Savona's, as well as from intermediate points along the road, various routes may be traced to the different passes of the Rocky Mountains. Of these passes, nine in number, only three appear to be fitted for forming lines of connection between the sea-coast of British Columbia and Canada, viz. the Leather Pass, 3760 feet; Howse Pass, 4500 feet; and Kicking Horse Pass, 5210 feet. In either case the road, 133 miles in length, already constructed from Yale to Savona, would form part of the line of route. The distances of these two routes do not greatly vary, and the estimate of cost is about the same. Their rival merits, in the judgment of the Commissioner, can only be determined after more exact inquiry has been made.

5. *The Cascades, Coast, and Gold Ranges of British Columbia.*

The main orographical features of the west coast are the Coast or Cascade Range, the great central hilly plateau or table-land, and the Rocky Mountain chain; subordinate to the latter, and more or less parallel with it, are two other belts of mountainous country, the Selkirk Mountains and the Gold Range. All these mountain chains, and likewise the central plateau, have a general north-west and south-east course. The Coast, or Cascade Range, is the northward extension of the Sierra Nevada; the hilly central plateau bears a similar relation to the great volcanic, arid, and hilly table-land of the State of Nevada; and the Selkirk and Gold Ranges may be paralleled with the Bitter Root Mountains between Montana and Idaho, the Wasatch Mountains in Utah, and other chains which occupy a similar position in relation to the main axis of the Rocky Mountains.

Exclusive of the volcanic cones and craters of Mount Baker, Mount Hood, Mount Rainier, and others, from 10,000 to 15,000 feet high, none of which, however, occur between the Fraser River mouth and Alaska, the highest points of the Cascade Mountains probably do not exceed 7000 feet. The central plateau has an average elevation of from 1000 to 3000 feet. The Selkirk Mountains, especially towards the north, in the vicinity of Cariboo, and about the sources of the North Thompson, have a somewhat greater average elevation than the Cascades, and they appear, likewise, to contain a greater number of glaciers and of points above the snow-line, though their more inland position may perhaps account for this fact irrespective of their altitude.

CHAPTER III.

THE RIVERS AND LAKES.

1. *General Features and Extent.*

CANADA has been called the country of waterways, as it surpasses all others in the area and navigable extent of its rivers and lakes.

Tourists, accustomed to the more restricted landscapes of Europe, do not readily grasp the idea of the majesty of the lakes, the grandeur of the rivers, or the awful power of the cataracts of Canada.

This extensive water-supply is an indication of the excess of the rain-fall over the evaporation, and also represents, to a certain extent, the gradual melting of the snows stored in the mountain ranges of the Rocky Mountains, and mirrors in the azure waters embosomed in the lakes, or gliding in the rivers towards the ocean, the immensity of the source from which it springs. An idea of the quantity of these waters may be realised from the fact that the river St. Lawrence and its tributary lakes, which constitute but one of the vast water-systems of Canada, are estimated to contain 12,000 cubic miles of water, or more than one-half the fresh water of the globe.

The configuration of the great fan-shaped plateau between the Pacific and Atlantic mountain ranges has been already noticed. It may now be remarked that almost all the great rivers of the continent take their rise on a limited area at the base of the Rocky Moun-

tains, namely, the Mackenzie River, emptying into the Arctic Ocean; the Missouri, with its affluent the Mississippi, falling into the Gulf of Mexico; the Saskatchewan, running into Lake Winnipeg, and from thence finding its way to the Atlantic Ocean through Hudson Bay; and the Fraser and Columbia, entering the Pacific Ocean. Nor need we travel far north from this plateau to reach the head-waters of the mighty Yukon, which gains the Pacific Ocean at Bering Strait, or far east to tap the head waters of the St. Lawrence chain of lakes, which reach the Atlantic Ocean by the river of the same name.

It will also be noticed, on reference to a map of the continent, that the several great lakes form a semicircle around Hudson Bay stretching from the Arctic to the Atlantic Ocean, namely, Great Bear Lake, Slave Lake, Athabasca Lake, Wollaston, Deer, Winnipeg, Winnipegosis, Manitoba, Lake of the Woods, Superior, Nipigon, Michigan, Huron, Erie, Ontario, and the great basin of the Gulf of the St. Lawrence, thus marking the ancient shore of the ocean retiring before a rising continent.

This great water-system, in keeping with the immense plateau which it traverses, not only affords means of communication, and carries fertility with it, but at the same time tempers the summer's heat and winter's cold, and in its pure waters purifies the air, so that Canada may be said to be free from the agues and malarial fevers which prevail where extreme heat and stagnant waters abound.

Nor are these lakes and rivers barren of products and food for man, as their cool waters swarm with the choicest fish, and are as valuable, acre for acre, as the richest agricultural land.

The eloquent Earl of Dufferin, when Governor-General of Canada, visited Manitoba and the North-West Territories in 1877, and being entertained by the Mayor and

Town Council of Winnipeg, delivered an address in which he referred to the extent and beauties of the "fluvial" system of Canada. In his usual felicitous manner, and with striking power of description and magic of language, he said:

"From its geographical position, and its peculiar characteristics, Manitoba may be regarded as the keystone of that mighty arch of sister provinces which spans the continent from the Atlantic to the Pacific. It was here that Canada, emerging from her woods and forests, first gazed upon her rolling prairies and unexplored North-West, and learnt as by an unexpected revelation that her historical territories of the Canadas, her eastern sea-boards of New Brunswick, Labrador, and Nova Scotia, her Laurentian lakes and valleys, corn-lands and pastures, though themselves more extensive than half a dozen European kingdoms, were but the vestibules and ante-chambers to that till then undreamt-of Dominion, whose illimitable dimensions alike confound the arithmetic of the surveyor and the verification of the explorer.

"It was hence that, counting her past achievements as but the preface and prelude to her future exertions and expanding destinies, she took a fresh departure, received the afflatus of a more imperial inspiration, and felt herself no longer a mere settler along the banks of a single river, but the owner of half a continent, and in the magnitude of her possession, in the wealth of her resources, in the sinews of her material might, the peer of any power on the earth.

"In a recent remarkably witty speech the Marquis of Salisbury alluded to the geographical misconceptions often engendered by the smallness of the maps upon which the figure of the world is depicted. To this cause is probably to be attributed the inadequate idea entertained by the best-educated persons of the extent of her

Majesty's North American possessions. Perhaps the best way of correcting such a universal misapprehension would be by a summary of the rivers which flow through them, for we know that as a poor man cannot afford to live in a big house, so a small country cannot support a big river. Now, to an Englishman or a Frenchman, the Severn or the Thames, the Seine or the Rhone, would appear considerable streams, but in the Ottawa, a mere affluent of the St. Lawrence,—an affluent, moreover, which reaches the parent stream 600 miles from its mouth,—we have a river nearly 550 miles long, and three or four times as big as any of them.

"But even after having ascended the St. Lawrence itself to Lake Ontario, and pursued it across Lake Huron, the Niagara, the St. Clair, and Lake Superior to Thunder Bay, a distance of 1500 miles, where are we? In the estimation of the person who has made the journey, at the end of all things; but to us who know better, scarcely at the commencement of the great fluvial systems of the Dominion; for, from that spot—that is to say, from Thunder Bay—we are able at once to ship our astonished traveller on to the Kaministiquia, a river of some hundred miles long. Thence almost in a straight line we launch him on to Lake Shebandowan and Rainy Lake and River —whose proper name, by-the-by, is 'Réné,' after the man who discovered it—a magnificent stream three hundred yards broad, and a couple of hundred miles long, down whose tranquil bosom he floats into the Lake of the Woods, where he finds himself on a sheet of water, which, though diminutive as compared with the inland seas he has left behind him, will probably be found sufficiently extensive to render him fearfully sea-sick during his passage across it. For the last eighty miles of his voyage, however, he will be consoled by sailing through a succession of land-locked channels, the beauty of whose

scenery, while it resembles, certainly excels the far-famed Thousand Islands of the St. Lawrence.

"From this lacustrian paradise of sylvan beauty we are able at once to transfer our friend to the Winnipeg, a river whose existence in the very heart and centre of the continent is in itself one of nature's most delightful miracles, so beautiful and varied are its rocky banks, its tufted islands,—so broad, so deep, so fervid, is the volume of its waters, the extent of their lake-like expansions, and the tremendous power of their rapids.

"At last let us suppose we have landed our traveller at the town of Winnipeg, the half-way house of the continent, the capital of the Prairie Province, and I trust the future 'umbilicus' of the Dominion. Having had so much of water, having now reached the home of the buffalo, like the extenuated Falstaff, he naturally 'babbles of green fields' and careers in imagination over the primeval grasses of the prairie. Not at all. Escorted by Mr. Mayor and the Town Council, we take him down to your quay, and ask him which he will ascend first, the Red River or the Assiniboine, two streams—the one 500 miles long, the other 480—which so happily mingle their waters within your city limits.

"After having given him a preliminary canter upon these respective rivers, we take him off to Lake Winnipeg, an inland sea 300 miles long and upwards of sixty broad, during the navigation of which for many a weary hour he will find himself out of sight of land, and probably a good deal more indisposed than ever he was on the Lake of the Woods, or even the Atlantic.

"At the north-west angle of Lake Winnipeg he hits upon the mouth of the Saskatchewan, the gateway and high road to the North-West, and the starting-point to another 1500 miles of navigable water flowing nearly due east and west between its alluvial banks.

"Having now reached the foot of the Rocky Mountains our 'Ancient Mariner'—for by this time he will be quite entitled to such an appellation—knowing that water cannot run up-hill, feels certain his aquatic experiences are concluded. He was never more mistaken. We immediately launch him upon the Athabasca and Mackenzie Rivers, and start him on a longer trip than he has yet undertaken—the navigation of the Mackenzie River alone exceeding 2500 miles. If he survives this last experience, we wind up his peregrinations by a concluding voyage of 1400 miles down the Frazer River, or, if he prefers it, the Thompson River, to Victoria, in Vancouver, whence, having previously provided him with a first-class return ticket for that purpose, he will probably prefer getting home *vid* the Canadian Pacific.

"Now, in this enumeration, those who are acquainted with the country are aware that for the sake of brevity I have omitted thousands of miles of other lakes and rivers which water various regions of the North-West—the Qu'Appelle River, Belly River, Lake Manitoba, the Winnipegosis, Shoal Lake, etc. etc., along which I might have dragged and finally exterminated our way-worn guest; but the sketch I have given is more than sufficient for my purpose; and when it is further remembered that the most of these streams flow for their entire length through alluvial plains of the richest description, where year after year wheat can be raised without manure, or any sensible diminution in its yield, and where the soil everywhere presents the appearance of a highly-cultivated suburban kitchen garden in England, enough has been said to display the agricultural riches of the Territories I have referred to, and the capabilities they possess of affording happy and prosperous homes to millions of the human race. . . .

"In a world apart, secluded from all extraneous

influences, nestling at the feet of her majestic mother, Canada dreams her dream, and forebodes her destiny—a dream of ever-broadening harvests, multiplying towns and villages, and expanding pastures; of constitutional self-government and a confederated empire; of page after page of honourable history added as her contribution to the annals of the Mother Country and to the glories of the British race; of a perpetuation for all time upon this continent of that temperate and well-balanced system of government which combines in one mighty whole, as the eternal possession of all Englishmen, the brilliant history and traditions of the past with the freest and most untrammelled liberty of action in the future. . . ."

In giving the statistics of these lakes and rivers, the following tabular statement shows their extent:—

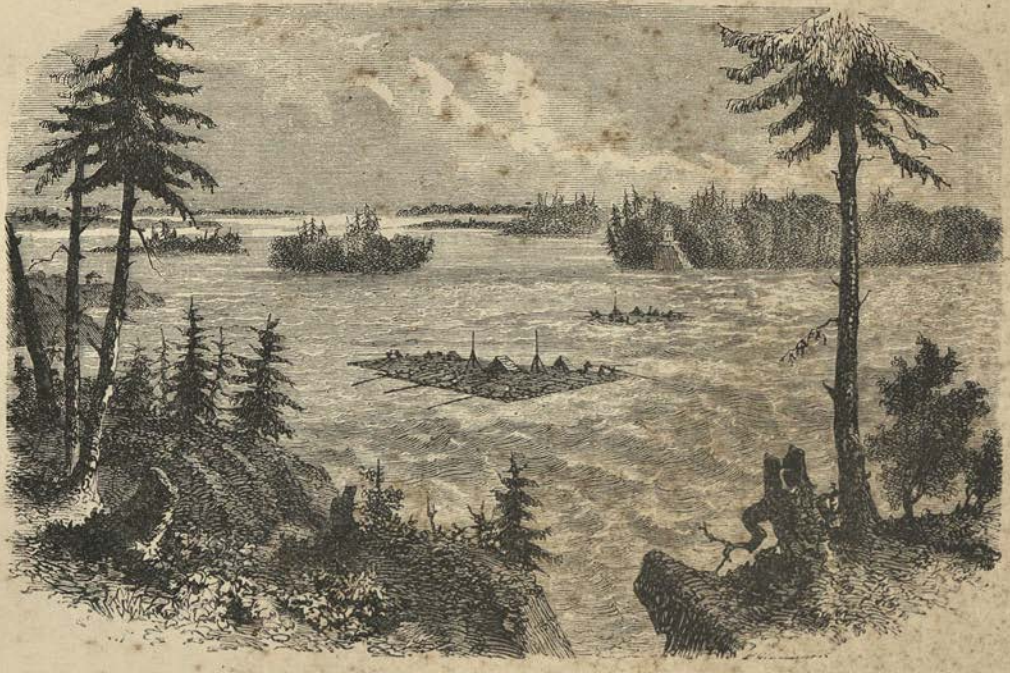
	Length.	Breadth.	Area.	Depth.	Elevation above sea.
Superior	420 miles.	160 miles.	31,500 sq. m.	1000 ft.	600 ft.
Huron	280 ,,	105 ,,	20,400 ,,	1000 ,,	574 ,,
Erie	240 ,,	57 ,,	9,000 ,,	200 ,,	565 ,,
Ontario	180 ,,	55 ,,	5,400 ,,	600 ,,	235 ,,

The lake system of the North-West Territories is low in altitude, covers an area of over 13,000 square miles, and is as follows:—

	Elevation above sea.	Area.
Winnipeg	710 ft.	8500 sq. miles.
Manitoba	751 ,,	1900 ,,
Winnepegosis	770 ,,	1936 ,,
Cedar Lake	770 ,,	312 ,,
Dauphin Lake	782 ,,	170 ,,

The four principal rivers on the eastern, northern, and western watersheds of Canada are:—

	Length in miles.	Drainage area in sq. miles.
The St. Lawrence	1500	330,000
Saskatchewan and Nelson	1500	450,000
Mackenzie, without its affluents	1200	440,000
Fraser	450	30,000



JUNCTION OF THE OTTAWA AND THE ST. LAWRENCE.

To face page 351.

2. *The River St. Lawrence.*

This river, the largest in North Ameriea as to volume, and second only in length to the Mississippi, united to its tributary the Missouri, issues from Lake Ontario in about 44° 10′ north latitude, and 76° 30′ west longitude, and flows in a north-easterly direction. It forms in a part of its course the boundary between the United States and Canada, and falls into the Gulf of the St. Lawrence by a broad estuary, in about 49° 30′ north latitude, and 64° west longitude.

Viewing it in connection with the great lakes, Nipigon, Superior, Michigan, Huron, Erie, and Ontario, which are its head-waters, and of which it is the outlet, it may be said to rise at the sources of the St. Louis River, which flows into Lake Superior.

The lie of these lakes is at first south-easterly, and trends gradually in a semicircle to north-east. The St. Lawrence receives nearly all the rivers that have their sources in the extensive range of northern mountains that separate the waters falling into Hudson Bay from those that descend towards the Atlantic Ocean, and also all those that rise in the highlands which are on the southern bank, and continue in a south-westerly course towards Lake Champlain.

Of these rivers the principal ones on the north are the Ottawa, Masquinongé, Saint Maurice, Saint Anne, Jacques Cartier, Saguenay, Betsiamite, and Manacougan; and on the south the Salmon, Chateauguay, Chambly or Richelieu, Yamaska, Saint Francis, Becancour, Du Chêne, Chaudière, and Du Loup rivers.

In different parts of its course the river St. Lawrence is known by different names; thus, from the sea to Kingston it is styled the St. Lawrence, between Lakes Ontario and Erie the Niagara River, between Lakes Erie

and St. Clair the Detroit, between Lake St. Clair and Lake Huron the river St. Clair, between Lakes Huron and Superior the Narrows or Sault St. Marie—all which sections form, united, a waterway of 2384 miles; the rapids in the section between Montreal and Kingston, and again between Lakes Ontario and Erie, where the Falls of Niagara intervene, being surmounted by canals.

Lake Superior may be considered as the inexhaustible spring whence the St. Lawrence has continued to derive its ample and pure waters, which have the azure tint of those of the ocean. Issuing from this lake with a rapid current, it rushes through the narrows of the Sault St. Marie for a distance of twenty-seven miles, and, tumbling over a rocky bed, enters Lake Huron. Lake Huron is united at its western extremity with Lake Michigan, a lake lying entirely within the United States, and separated from Lake Huron by the Straits of Mackinaw and by a peninsula of about 150 miles across at its widest part. It is fed by many considerable rivers and several inferior streams from the height of land on this peninsula, as well as by several large rivers which enter it on its north shore and through the Georgian Bay—a large bay on its north-eastern side. Of these latter rivers the French river is an important one, as it connects with Lake Nipissing, and by a succession of smaller lakes affords an easy means of making the communication by water complete, from Lake Huron to the Ottawa River, and thence to the St. Lawrence at Montreal.

From the extremity of Lake Huron to the southward, the channel contracts into the St. Clair River, which, after flowing nearly due south for sixty miles, between moderately high banks adorned by many natural beauties, expands into the small lake of the same name.

Issuing from this lake the river continues its course southwardly for forty miles under the name of the Detroit

FALLS OF NIAGARA.

To face page 353.

River, and there falls into Lake Erie. There are many islands in this part of the river, some of them of considerable size, and the scenery on the east side is diversified and agreeable.

From the north-east end of Lake Erie the connection with Lake Ontario is by the Niagara River thirty-six miles in length, and from half a mile to three miles in width. Its course is nearly north, and the stream is divided in several places by islands, the largest of which, Grand Island, is seven miles in length.

The levels of the country here change by a sudden drop to the lower plateau on which Lake Ontario lies, and as the Niagara River approaches its fearful leap at the "Falls" its waters appear to lash themselves into a fury, and surge like the breakers on a rock-bound coast. This portion of the river, by its picturesqueness and "life of waters," must ever attract the admirer of nature. Having now reached the great Falls of Niagara, a short description will be given of them, as they are looked on by Europeans as the central point from which the continent of America radiates.

N. P. Willis, in Bartlett's *Illustrated Canada,* says :—

"The Falls of Niagara impress travellers very differently. Most persons, having heard of this wonder of the world from their childhood, have aggrandised their imagination of its appearance in proportion with the growth of their minds, and visit Niagara, at last, with the expectation of seeing an ocean poured from the height of the clouds." He quotes a description by a traveller who remarks :—

"I first visited these celebrated Falls in the month of September—a season of the year which in America is peculiarly pleasant. Until I arrived within a mile of the Falls, the sky was perfectly clear, the sun shone with his wonted splendour, and the atmosphere

was remarkably dry and uncommonly lucid. But no sooner had I approached their immediate vicinity, than a sudden and singular change took place in the whole aspect of nature. The earth, before parched and immovable, became damp and tremulous, and the sky, till then unsullied by a single cloud, assumed a frowning, dark, and portentous appearance. The atmosphere, previously dry and rarefied, now presented a dense and humid visage; and my fancy, unreined by my reason, transported me into a world essentially different from that in which, a few minutes before, I lived and moved and had my being.

"Still, however, I pursued my course, and at length gained the summit of the craggy hills which flank this noble river. My increased elevation did not contribute to dissipate the preconceived delusion, and I still felt inclined to doubt of my own or the world's identity. Mountains of water, belching forth the most appalling sounds; globes of foam, boiling with rage; rainbows, embracing within their numerous and splendid arches a surprising variety of newly formed impending clouds; rocks, boldly projecting over the tumultuous abyss; and spray-covered forests, decorated with pearly drops, now rendered more brilliant than crystal by the reflected rays of the setting sun, and now blown into feathery streams by sudden gusts of the impetuous wind. These were some of the most striking features of the gorgeous scenery by which I was surrounded. Long did I luxuriate in pleasing contemplation, admiring its peculiar grandeur; and still did I find myself lingering amidst these stupendous and matchless displays of creative excellence, until the sun, wearied with shedding his beams on the trans-Atlantic wilds, had retired, in all his glory, 'to rove o'er other lands, and give to other men the kindest boon of Heaven.'"

It may be added to this sketchy but graphic description that Goat Island divides the waters of the Fall. On the Canadian side the rock is worn into the shape of a horse-shoe, which gives the name to this Fall, and has a width of 1900 feet, with a precipice of 160 feet. The American Fall, 660 feet wide, is straight in its line, and with much less water than the Horse Shoe Fall.

The rumbling or thunder of the Falls is sometimes heard with a favourable wind for thirty or forty miles, and the trembling of the earth from the concussion of

NIAGARA.

the water, for fifteen miles around; while the column of spray, with its prismatic colours, is visible sometimes at seventy miles.

The chasm below is worn in the solid rock, and extends to the town of Niagara, at the mouth of the Niagara River on Lake Ontario, some miles below. This gradual retirement of the Falls towards Lake Erie commenced, as assumed by Sir Charles Lyell, from a geological examination of the strata, and a calculation of the time necessary to cause the wear, some 10,000 years since, and is still in progress, while the river is ever pouring its vast volume of waters into the abyss below.

The quantity of water passing over the Falls is estimated at 701,250 tons per second, and the power at 4,500,000 horse-power.

It is only after the mind has become impressed with the "continuance" of this great "movement of the waters," that the majesty of this object of natural beauty is fully realised.

It may be remarked that the level of the river here, as in the other parts of the St. Lawrence, is very uniform, although, on a few occasions, the waters of Lake Erie have been lowered at its eastern end by a continued and strong easterly wind.

Below the Falls the river follows the channel which it has excavated for itself, and, regarded from the banks, which on either side are precipitous stone walls almost 200 feet deep, it moves so stilly that the contrast between its fury and repose is complete.

Five miles below occurs a great maelstrom or whirlpool, occasioned by the stream sweeping with such violence around a natural basin that it ensures destruction to whatever comes within its attraction.

Here the velocity of the current is subdued, and the river thence follows its tranquil course to Lake Ontario.

Lake Ontario receives but few other rivers, and the principal ones are on the southern or American shore. At the eastern end of the Lake, Wolfe Isle is the largest of several that are in the vicinity of Kingston, and divides the stream into two main branches, known as the North or Kingston Channel, and the South or Carleton Island Channel.

Here we enter the St. Lawrence proper, and find it studded with islands between this point and Brockville, some forty miles below, and known to number about 2000. To avoid exaggeration they are called the "Thousand Islands." The scene here is one of fairy

enchantment, to be realised only when seen in the stilly morn, the summer's eve, or under a Canadian moon. It is now admitted by artists of experience that the Canadian atmosphere is equally brilliant with that of Italy, and hence the term "Canadian moon." The distance between Kingston and Montreal is 190 miles. On our way the Lakes St. Francis, St. Regis, and Two Mountains are traversed. These lakes cannot be compared with those already noticed, and can, indeed, only be considered as so many expansions of the river. They are of no great depth, and have many pretty islands scattered about them. Lake St. Francis is twenty-five miles long by five and a half broad. The shores are in some places marshy, as they do not rise much above the level of the water. Lake St. Louis and Deux Montagnes (Two Mountains) are near the junction of the Ottawa with the St. Lawrence. The first is twelve miles long by six broad; the latter is very irregular in outline, twenty-four miles long, and varying in breadth from one mile to six. At the confluence of the two rivers are the Islands of Montreal, Jesus, Bizard, and Perrot. On the north-west lies Isle Jesus, which, by its position, forms two channels of a moderate breadth—one called La Rivière des Prairies, and the other La Rivière de St. Jean or Jesus. These channels are both navigable for boats and rafts, and unite again with the main river at Bout de l'île, at the east end of the Island of Montreal. The rapids of the St. Lawrence between Kingston and Montreal are so picturesque and beautiful that they must be noticed for the benefit of the tourist who may desire to "run" the rapids. The first one is met at Cornwall, and the last at Lachine, in the following order: The Platte, the Galops, the Long Sault, the Cedars, the Cascades, and the Lachine. These constitute the grandest and most extensive rapids imaginable. The first and second are striking. The Long Sault, nine miles in

length, is a perfect sea, with its waves surging and dashing in snowy crests over the upper works of the steamer. The Cedars and Cascades, more picturesque, although not so boisterous as the Long Sault, are charming reaches of river scenery; while at Lachine the apparent peril of the vessel as she pitches forward among the breakers, and has her passage apparently barred by opposing rocks, adds a zest to the scene, although no actual danger exists. The view from the Lachine rapids is very impressive, for amid these snowy-crested waves, divided here and there by a barrier of rocky islands and shoals, there is seen in the distance, and about six miles below, an open stretch of water or basin which narrows to about two miles, and there stands the Victoria Bridge, spanning the river and the harbour of Montreal, lined with its steamships and river craft. At mid-channel, below the bridge, is the island gem, St. Helène, an historic point, and on the left bank stands the bright City of Montreal, with its gray marble buildings and leafy heights rising terrace above terrace, until Mount Royal appears with its majestic maple-groves and royal pines, smiling, as it were, over the peaceful scene below. About forty-five miles below the City of Montreal, on the south side of the St. Lawrence, is the town of Sorel, built at the mouth of the river Richelieu, an affluent of the St. Lawrence. Not far from here the river St. Lawrence expands into Lake St. Peter, the last of the lakes in the passage to the sea. This lake is thirty miles long and nine broad, with a depth of only eleven to twelve feet on a part known as the "flats." This want of water interfered with the navigation of the river up to Montreal from the sea, and was overcome at an enormous expense by steam-dredging, as stated in the chapter on Canals. About forty-five miles below Sorel, on the north shore, at the mouth of the river St.

Maurice, stands the town of Three Rivers, the second oldest town in Canada. From Montreal, thus far, the banks are of a very moderate elevation, and uniformly level; but below Three Rivers they become higher, and gradually increase on approaching Quebec until they attain the height of Cape Diamond, upon which the citadel is built. The view from this eminence, and from Point Levi on the south shore, is particularly striking. The following description may be quoted as a very good one :—

"The scenery of Quebec and the surrounding country is described by all travellers as rivalling in picturesque beauty the most favoured parts of the earth. The navigator who ascends the St. Lawrence, after he has passed the Isle of Orleans and entered the broad basin already mentioned, where he first comes in sight of this capital, is struck with intense admiration. He sees its citadel crowning a lofty cliff, its castle and batteries overhanging a range of formidable steeps, the river crowded with numerous vessels of every form and size, from the huge timber-ships to the bark canoe. The Fall of Montmorenci appears dashing its white foam almost to the clouds, and on each side is a long range of fertile and beautiful shore. On ascending Cape Diamond, a still grander and more extensive panorama bursts upon his view, combining all the boldness of rude with the richness of cultivated nature. Up and down the magnificent stream of the St. Lawrence is a reach of more than forty miles, on which sails almost innumerable are in ceaseless movement. Below is the beautiful Isle of Orleans, while the opposite coast is diversified by a great variety of natural and cultivated scenery. To the north appears the river St. Charles, winding amid fertile valleys and hills, with villages hanging on their sides, while the prospect is closed by a bold screen of mountains."

Mr. Meld prefers the views from the upper town, where, though fewer objects are seen, they appear more distinct and brilliant.

This traveller, after visiting a great part of Europe and America, gives to them a preference over everything he had observed on either continent. Mr. M'Gregor considers them similar, but much superior, to those from the castles of Edinburgh and Stirling.

A little below the city of Quebec the Island of Orleans divides the river into two channels. The south shore is high, the north mountainous, but both are thickly settled, and the lands well cultivated. From the upper end of the Island of Orleans are seen the Falls of the Montmorenci River, which leaps in an unbroken sheet over a rocky bank about 250 feet in height. This river empties into the St. Lawrence on the north shore, about six miles below Quebec.

Proceeding down the river, the traveller sees several large islands, among which the principal are Grosse Island and Crane Island, which are cultivated, but the others are in a state of nature.

At Rivière du Sud the St. Lawrence has increased to a width of eleven miles, and the country on either shore cannot easily be rivalled for picturesqueness, as village succeeds village, conspicuous by contrasting their bright church steeples and white-tinted houses with the rich foliage of the trees; the whole backed by rising-grounds, and the bold but distant outline of the Notre Dame Mountains, which form the southern boundary of the Province.

Beyond Rivière du Sud occurs what is called the "Traverse," where the channel is intricate, and vessels have to cross from one side of the river to the other, as indicated by buoys and lights.

Passing the Traverse, a very agreeable view of the settlements of the Bay of St. Paul, enclosed within an

amphitheatre of very high hills, and the well-cultivated Isle Aux Coudres at its entrance, presents itself. Continuing down the river, the next in succession are the Islands of Kamouraska, the Pilgrims, Hare Island, and the cluster of small ones near it, named the Brandy Pots. From hence, at no great distance, is Green Island; near Green Island is Red Island, and abreast of it, on the northern shore, is the mouth of the Saguenay River.

This river, over a mile in width, and 1000 feet in depth, is remarkable, even in America, for the volume of the waters it pours into the St. Lawrence. As this river is described among the tributaries of the St. Lawrence, we proceed, and pass Bic Island and Father Point, at which point the ocean steamers land the mails and such passengers as wish to take the Inter-Colonial Railway, there skirting the south shore of the St. Lawrence, and continuing to do so as far as Quebec.

The river has now widened to thirty miles, but the Gulf cannot be said to have been reached before Point de Monts, on the north shore, longitude 67° 30′, latitude 49° 15′, is passed; and even this may be questioned, as the Gaspé peninsula continues about three degrees farther, and terminates at its most easterly point in Cape Gaspé.

Were we to follow the northern shore to Blanc Sablon, the boundary between the Dominion and Labrador would be reached at the Strait of Belle Isle, and opposite the northern end of Newfoundland.

The island of Anticosti would have also been passed. This large island, estimated to contain 2600 square miles, lies off the north shore between latitudes 49° and 50° north and longitudes 62° and 65° west; and although the interior is hilly, there is much good land, and it is well adapted for agriculture. It is a favourite resort for bear-hunting, as well as for salmon and trout fishing, but has few inhabitants.

The vast Gulf now opens between the head of the Strait of Belle Isle to the north, and the shores of New Brunswick and Nova Scotia on the south; whilst the Magdalen Islands lie opposite to the main entrance between the southern cape of Newfoundland and the northern point of Cape Breton Island.

These Magdalen Islands are a group of thirteen small islands stretching north-east from Prince Edward Island, from which they are distant about fifty-four miles, and from Newfoundland, west-south-west about 100 miles. Amherst, Grindstone, Grosse, Byron, and Coffin islands,—the latter twenty-five miles long but very narrow,—are the principal ones. Amherst Island contains the best harbour. These islands were formerly under the government of Newfoundland, but are now annexed to Canada.

The fisheries of these islands are very productive, and are the mainstay of the inhabitants, numbering some 4000 souls. Considerable deposits of gypsum are found on the islands, also ores of manganese and iron.

We have thus followed the St. Lawrence from its head waters to the Atlantic, and in conclusion may state that every advantage which science can secure in buoys, beacons, and submarine telegraphs, has been adopted, and that the coast-line which this river and gulf afford to Canada is one of her greatest natural advantages.

It may be said that its shores are inhabited throughout their entire length,—sparsely, it is true,—east of the Saguenay by fishermen, and to the north on Lake Superior by a mining population; but between these points, a thousand miles apart, the farms of the agriculturist, and the villages, towns, and cities of the remainder of the population of the Provinces of Quebec and Ontario to the north, and of New Brunswick and Nova Scotia to the south, give life and animation to the scene.

In the following pages reference will be made to the

shipping and fisheries of its waters, and to the lumber and mining interests of its shores; but when it is considered that between Ireland and Newfoundland the trip is made in five days, and that there is afterwards still water and the option, after a sail of two days more, to take the railway, it will be evident that the passage of the Atlantic on this route, and with first-class steamers, has been made short, safe, and easy.

A short description is now given of the tributaries of the St. Lawrence River.

3. *Tributaries of the St. Lawrence.*

The Ottawa River.—Having given the *reserve* supply of the St. Lawrence derived from the great lakes, it is necessary now to state the *active* supply which it receives from its tributaries. The largest of these is the Ottawa—so called from the Outoais tribe of Indians who lived on its banks—a magnificent river, which in its turn receives affluents of mighty rivers. It is in considering the size and drainage of these rivers that the volume of the St. Lawrence can be understood.

The Ottawa rises near the 49th parallel of latitude in longitude 76° west. It is about 780 miles long, and 300 miles from its source passes through Lake Temiscamang, 67 miles long. Above this lake the country drained by the Ottawa is little known, but below it, for a distance of 430 miles, the river has been surveyed. Montreal River, the old canoe route of the Hudson Bay Company, comes in from the north-west, thirty-four miles down Lake Temiscamang; and six miles lower down the almost unknown river Keepawa plunges into the lake in a magnificent cascade 120 feet in height. From the Long-Sault, at the foot of Lake Temiscamang, 233 miles above the city of Ottawa, the river is not navigable for a distance of

eighty-nine miles, except for canoes. Between the last-named point and Ottawa, a distance of 197 miles, numerous tributaries swell its waters, and one of these, the Matawan, coming from the west, is of especial interest, in consequence of being on the line of the proposed ship-canal route between the Ottawa River and Lake Huron. Above the Upper Allumette Lake there is a navigable reach of water forty-three miles in length. The mountains above Allumette Lake are upwards of 1000 feet in height, and the scenery is very grand. The mountains on the north side of Colounge Lake are 1500 feet high, and the scenery beautiful. The Petèwahweh, one of the largest tributaries, 140 miles long, drains an area of 2200 square miles; the Black River, 120 miles long, drains 1120 square miles; and thirty-nine miles above Ottawa City, the Madawaska, one of the greatest feeders, and 240 miles long, drains 4100 square miles. Six miles above Ottawa the rapids begin which terminate in the celebrated "Chaudière" Falls, whose tumultuous waters plunge forty feet and partly disappear in the "Lost Chaudière" by an underground passage, whose subsequent outlet is unknown. At Ottawa the great or main river receives the Rideau River on the south shore, distinguished by its canal, which connects the Ottawa River at the capital with Lake Ontario at Kingston. The largest tributary of the Ottawa River is the Gatineau, which empties into the Ottawa on the north bank opposite to the city of Ottawa. This river has a course of 420 miles, and drains 12,000 square miles of territory. Eighteen miles below Ottawa is the River Du Lièvre, draining an area of 4100 square miles; below this river there are numerous tributaries to the Ottawa, varying from 90 to 160 miles in length, which cannot be here described, although worthy of being so. The rapids below Ottawa are avoided by a succession of canals. One

hundred and thirty miles below the capital of the Dominion the Ottawa's waters meet those of the St. Lawrence, and for many miles their dark hue distinguishes them from the azure waters of the St. Lawrence, afterwards blended in their onward course to the sea.

The valley drained by the Ottawa is 80,000 square miles in area, for the most part covered with valuable timber, particularly red and white pine. It is abundantly intersected with large rivers, which afford the means of floating the timber of the lumberman to market, and contains a very considerable area of the best soil. The country, behind what has been called the red pine region, is generally beautiful and undulating, and sustains a growth of maple, beech, birch, and elm. No region of equal extent enjoys so much excellent water-power, with such ample supplies of timber and minerals. It is a region rich in ores of iron, lead, and copper, also in plumbago, marbles, ochres, and phosphates. The city of Ottawa was founded by Colonel By in 1827, at the time of the construction of the Rideau Canal. It is situated a little below the beautiful and curious falls of the Chaudière, and stands upon a high and bold eminence surrounding a deep bay. Lord Sydenham recommended Bytown, as it was then named, as a very favourable situation for the seat of government, which distinction it afterwards received on the reference by the Canadian Parliament to Her Majesty the Queen.

The tributaries of the St. Lawrence are so numerous that the description must be limited by our space to the principal ones.

The St. Maurice, which falls into the St. Lawrence at Three Rivers, just below Lake St. Peter, is about 300 miles in length, and is excessively rapid. It rises in the Laurentian range, traverses a mountainous country, receives as its tributaries about ten large rivers, and falling

over a ledge of rocks at the magnificent Falls of Shawinegan, about forty miles from the St. Lawrence, for which distance it is navigable and uninterrupted, reaches its mouth in the St. Lawrence, where it is about a mile wide.

The Saguenay, from its mouth, about 120 miles below Quebec, where it falls into the St. Lawrence on the north shore, to a distance of seventy miles, is a river over a mile in width, bounded on either side by mountains of 1500 feet in height. This gorge is evidently a fissure in the Laurentian Range, as, were the shores brought together, the opposite hills would apparently fit. The depth of the river is great, and in most places corresponds with the height of the precipitous mountains on either shore. The head-waters of this river are on the height of land dividing the province of Quebec from the Hudson Bay Territories, about 120 miles from the St. Lawrence. It opens out into the Lake St. John, about 100 miles inland. This lake is about thirty miles long and twenty-five miles wide. Some large lumbering establishments have been carried on here for years, but the Saguenay is celebrated chiefly for its scenery and for the salmon rivers which enter it. Tadousac, a favourite bathing-place, is at its mouth. Here are still to be seen the foundations of the first stone buildings erected by the French in Canada, and a little wooden church, the first one erected in Canada, is still in good preservation in the little bay near the mouth of the river.

There are steamers regularly running to Chicoutimi, seventy-five miles up this river, and a comfortable hotel at Tadousac is much frequented by tourists.

It may be remarked that the head waters of the three great tributaries of the St. Lawrence on its north shore, namely, the Ottawa, the St. Maurice, and the Saguenay, rise in chains of lakes to the north, on the height of land above referred to, and that it is possible, by short *portages*

between the lakes, to pass from one to the other of these rivers.

Passing from the north shore, where the rivers, besides those described, are innumerable and of considerable size, to the south, we meet

The Richelieu, or River of the Iroquois. This river, about eighty miles long, is navigable from Sorel at its mouth to Chambly Fort and Basin. It is the outlet of Lake Champlain, and was used by the French in their wars with the Iroquois, and afterwards in their advances against the English colonists. Still later it became the great line of attack adopted by the Americans in their wars with the Canadians. The valley of the Richelieu is one of the most beautiful and fertile sections of the province of Quebec. The rapids at Chambly can be surmounted by a canoe.

The St. Francis, a river of about 130 miles in length, is the outlet of the lakes St. Francis and Memphremagog —the latter a beautiful lake, equal to any of the Cumberland lakes. This river falls into the St. Lawrence at Port St. Francis, a small place of no note.

The Chaudière, a river of 110 miles in length, falls into the St. Lawrence about six miles above Quebec. It is celebrated chiefly for a beautiful fall near its mouth, and for its gold-fields.

The only rivers familiar by name which have not been described on either shore—and their name is legion—are the Montmorenci, about six miles below Quebec, celebrated for a beautiful fall of 240 feet, and the Jacques Cartier, about six miles above Quebec, celebrated for its salmon pools.

In another part of this work a list is given of the salmon rivers leased by the Government for rod fishing, but it may be stated generally that all the lakes and rivers on the north shore abound in speckled trout, and

that sea-trout and salmon frequent the rivers as high as tide waters.

The vast and picturesque lakes now claim attention.

Although the description of these lakes is necessarily limited, it must not be assumed that they are unattractive or uninteresting. Nothing can be farther from the truth, as no more beautiful or enjoyable trip can be made than over their sparkling waters in the palace steamers, which constantly carry tourists and passengers, and provide accommodation such as is not known in Europe, so luxuriously are they fitted and found. Add to this the attraction of the richest agricultural display of farms, and farmers' well-appointed and, in many cases, very extensive homesteads, groves of trees, well-kept grass lands, cosy hamlets, gay villages, bustling towns, or noisy cities, with the restless engine working its way with a steam cloud as it traverses the shores, and the reader will feel satisfied that the lakes of Canada will alone afford material where the artist, the poet, the sportsman, the tourist, the merchant, and the *litterateur*, may revel and still feel that the end is not reached.

4. *Lake Ontario.*

Lake Ontario, the smallest and most easterly of the five great lakes which communicate with the river St. Lawrence, is situated between 43° 10′ and 44° 10′ north latitude, and 76° and 80° west longitude.

It divides the State of New York from Canada on the north, the line of its greatest extent running nearly due east and west.

Its greatest length is about 190 miles, and greatest breadth 55 miles. The entire area is estimated at 5400 square miles. The surface is 334 feet below that of Erie, and about 230 feet above the tide water in the St.

Lawrence. The greatest depth is upwards of 600 feet, and it is navigable in every part for vessels of the largest class. It is never closed with ice, and never freezes, even in the severest weather, except in shallow places along the shore.

Lake Ontario receives its chief supply from the great lakes through Niagara River, though considerable accessions are brought to it by the Genessee, Oswego, and Trent rivers, and numerous smaller rivers, both from the Canadian and United States shores. It discharges its waters by the St. Lawrence. It is connected with Lake Erie by the Welland Canal, twenty-eight miles long. The lake contains a great variety of fine fish, among which may be named the salmon-trout, whitefish, and Oswego bass.

Situated on a beautiful circular bay, on the north-west shore of Lake Ontario, is one of the most flourishing cities of the Dominion, viz. Toronto.

The other principal cities on its shores are Hamilton, west of Toronto, Niagara on the opposite side of the lake, and Windsor, Port Hope, Cobourg, Belleville, and Kingston, east of Toronto.

This beautiful inland sea is studded with sails and enlivened by steamers, whose busy keels are ever engaged in transporting the products of the country, or carrying rich freights farther inland.

On its shores La Salle in 1679 built the first vessel constructed in Canada, and at the present day the fast-growing cities on its shores, and the vessels on its waters, afford a pleasing illustration of Canadian progress.

5. *Lake Erie.*

Lake Erie, the next in order, proceeding westwardly, of the great lakes, lies about north-east and south-west between 41° 25′ and 42° 55′ north latitude, and between

78°. 55′ and 83° 25′ west longitude, with the province of Ontario on the north, a part of the States of New York, Pennsylvania, and Ohio on the south, and a part of Michigan on the west.

Its shape is elliptical, the entire length being about 240 miles, its greatest breadth 57 miles, average breadth 38 miles, computed circumference 658 miles. The depth of the lake is less than that of any other in the chain, the greatest yet obtained from soundings being only 220 feet. Towards the shores, and especially at the western extremity, its shallowness is a serious impediment to navigation, which is entirely suspended during the winter months, in consequence of the shoal portions being frozen.

The surface of Lake Erie has an elevation of 322 feet above the level of Ontario, and 565 feet above high-water mark in the St. Lawrence at Quebec.

Its principal supply is by the Detroit and St. Clair rivers, which constitute the outlet of the three great lakes to the north-west, viz. Huron, Michigan, and Superior.

Numerous rivers flow into it from the south, the more important of which are the Maumee, Sandusky, Grand, Huron, and Raisin. Its own waters are discharged by the Niagara River into Lake Ontario, and thence by the river St. Lawrence into the ocean.

The principal harbours on the Canadian shore are the Grand River, Port Colborne, Port Dover, Port Stanley, and Leamington. Long Point, a narrow neck of land stretching into the lake near Port Stanley, is so much frequented by immense flocks of ducks that it is held by a company of sportsmen as a duck preserve, and affords immense bags of game. The lake also abounds with fine fish.

Here is the land of the vine, as the Niagara district of Western Ontario and the shores of Lake Erie are

celebrated for their fruits. The richest of our native grapes, full in flesh and rich in flavour and colour, the peach, the nectarine, the pear, the plum, the apple, the cherry, the melon, and the tomato, are to be found in abundance along its shores.

6. *Lake Huron and Georgian Bay.*

Lake Huron, the third in order and in size of the great lakes of North America, communicating with the St. Lawrence River, lies between 43° and 46° 15′ north latitude, and between 80° and 84° 40′ west longitude, being bounded on the south-south-west by the State of Michigan, and in all other directions by the Province of Ontario, and receives its supply of water from Lake Superior, by the Sault St. Marie, and from Lake Michigan, through the Strait of Michilimacinac, abbreviated into Mackinaw. It is divided into two unequal portions by a long peninsula named Cabot Head and the Manitoulin chain of islands. The parts to the north and east are called Manitou, *i.e.* the Great Spirit Bay, or the North Channel and Manitoulin Lake or Georgian Bay. With the exception of these bodies of water and Saginaw Bay, the outline of Lake Huron approaches in form very nearly to a crescent.

Its position, lengthwise, is about S.S.E. and N.N.W., and the distance from one extremity to the other, following the curve, does not vary much from 280 miles. The greatest breadth, exclusive of Georgian Bay, is 105 miles, the average breadth 70 miles, and the estimated area 20,400 square miles. The surface of the water is elevated 19 feet above Lake Erie, 352 feet above Lake Ontario, and 600 feet above the level of the sea.

The depth of Lake Huron is greater than that of any other in the chain, averaging, probably, not less than

1000 feet. Off Saginaw Bay, it is said that leads have been sunk 1800 feet—1200 feet below the level of the Atlantic Ocean—without reaching the bottom.

The waters are remarkably clear, especially towards the Strait of Mackinaw, and very pure and sweet. It is to their peculiar transparency that Dr. Drake attributes the fact, which he ascertained by actual experiment, that the temperature of the water at the surface and 200 feet below is precisely the same—fifty-six degrees. The sun's rays pass through the water as through a cloudless atmosphere, without meeting with sufficient solid matter in suspension to elicit heat.

This lake is said to contain upwards of 3000 considerable islands. It receives numerous rivers, and its coast affords very fine harbours. Like most of the other lakes in the chain, it is subject to fearful storms, but its navigation is not generally considered dangerous. The scenery of the northern shore and around the historic Strait of Mackinaw is alone worth a visit from Europe.

7. *Lake Superior.*

Lake Superior is the most westerly and most elevated of the North American chain of lakes, and is the largest expanse of fresh water on the globe. This is truly a sea.

It extends from latitude 46° 25′ to 49° north, and from longitude 84° 30′ to 92° 20′ west. It has Minnesota on the west and north-west, Wisconsin and the north peninsula of Michigan on the south, and Ontario in all other directions.

The greatest length, measured on a curve through its centre from east to west, is 420 miles; the greatest breadth, 160 miles; and the circuit about 1750 miles. Height above the sea-level, 630 feet; depth varying from 80 to 200 fathoms.

It is of very irregular shape, widening towards its centre, and gradually narrowing, partly towards the east, but much more so towards the west extremity, thus forming an irregular crescent, with its convexity on the north and its concavity on the south.

The north shore is generally bold and elevated, presenting almost continuous ranges of cliffs, which vary in height from 300 to 1500 feet; the south shore is low and sandy, though occasionally interrupted by sandstone ridges, the most remarkable of which, situated towards the eastern extremity, presents a perpendicular wall 70 to 80 feet high, broken by numerous caverns and projections, and forming, under the name of the Pictured Rocks, one of the greatest natural curiosities in America.

The central portion of the lake is free from islands, which, however, are numerous both towards the southern and northern side. In the former direction they are generally small; but in the latter several, more especially the Isle Royal, are of considerable dimensions, and, along with the indentations of the coast, afford good shelter for vessels.

The water of the lake is remarkable for its transparency, and is derived from a basin estimated at 100,000 square miles, drained by more than 200 streams. About thirty of these are of considerable size, but they are almost all impetuous torrents, interrupted by rocks and rapids.

The outlet is by the St. Mary Strait, at the south-east, which communicates with Lake Huron and the other great lakes whose waters reach the ocean through the St. Lawrence. St. Mary Strait (Sault St. Marie) descends twenty-two feet in a distance of three-fourths of a mile, forming a series of rapids, around which a navigable canal has been constructed on the United States side, forming the last link of the chain of communication between the great lakes, and adding above 1700 miles to

our coast trade. Within the lake itself the only obstructions to its navigation are the violent gales to which it is subject. It is well supplied with fish, principally trout of great size and of a delicious flavour, white-fish, and sturgeon. The two former are of excellent quality, and have led to the establishment of a number of fishing stations.

The principal exports from Lake Superior are ores of silver, copper, and iron, of which deposits of great richness and extent have been discovered both on its shores and islands. The silver-mines of Lake Superior are very rich, successful, and most profitable; explorations are being prosecuted on a number of islands and on the mainland by several companies. The most valuable deposits of silver yet found have been on Silver Islet, where the yield is very great.

The boundary-line between Canada and the United States in Lake Superior proceeds through its centre until it approaches Isle Royal, when it trends north, so as to give that island entirely to the United States, and is then carried south-west to its termination at the mouth of Pigeon River in latitude 48° north.

The scenery of Lake Superior has never been described, and, unfortunately, there is no room for it here; but the precipitous and mountainous north shore is mirrored in the clear waters, so that it is difficult to realise where rock, water, and cloud begin or end.

8. *Lake Nipigon.*

"Nipigon," a contraction of a word signifying "Deep Clear Water Lake," is a large lake of Ontario, thirty miles north-west of Lake Superior. Its general outline is oval in form. The shore on the southern side is deeply indented by large bays; and on the northern, Ombabika

Bay is nearly twenty miles long, with an entrance only a mile wide. These indentations increase very much the coast-line, which measures 580 miles. Lake Nipigon is very thickly studded with islands, estimated at upwards of 1000. Some 500 or 600 have already been examined, varying in size from eight miles in diameter to a few chains in length. The streams flowing into the lake are very numerous; among the largest are Kayoshk or Gull River, Na-me-wa-min-i-kan or Sturgeon River, sometimes also called the Poplar Lodge River, from the name of the Hudson Bay Company's post at its mouth.

The aspect of the country around Lake Nipigon, and of the islands within it, is undulating, and sometimes hilly, but level tracts of considerable extent occur in some places. The largest tract of good land appears to be on the south-western side of the lake. For fifty miles from the Nonwatan River northwards the country is mostly level and the soil fertile. The Indians represent this tract as continuing nearly to the Winnipeg River, becoming more level as it recedes westward. Around South Bay and M'Intyre Bay, the two largest bays of the south, there is a considerable area of good land. Along the Kabitotiquia on the west, on both sides of the river, the country is level and the soil sandy, supporting a growth of grass and bushes, the timber having been burned off by repeated fires. The land is free from stones, and almost ready for the plough.

To the north-westward the country is low, and a level tract extends north to an unknown distance. To the north-east, along Ombabika Bay, as far as the eye can reach, the country is level and the soil good.

The climate appears to be as well suited for agricultural purposes as the greater part of the Province of Quebec. Farming has been successfully carried on for a long time at Nipigon House, the Hudson Bay Company's post.

The timber is principally white spruce, birch, aspen, poplar, balsam, fir, with occasional trees of black ash, gray elm, and white pine. Lake Nipigon is 313 feet above the level of Lake Superior, and its depth of water is very great; in some parts a line of 540 feet has failed to touch the bottom.

The shores on the south and east are bolder, and the water deeper, than on the north and west. The lake has its outlet in the Nipigon River, which issues from the south-east side, and empties into Lake Superior, to which it is by far the largest tributary, and may be regarded as the chief source of the St. Lawrence.

This lake is still in a state of nature, and is very little known except from the report of Professor Bell of the Geological Survey.

Lately, however, some adventurous sportsmen visited it, and discovered that its outlet swarms with speckled trout, ranging from one to seven pounds in weight, and commonly over four pounds.

CHAPTER IV.

THE BASIN OF HUDSON BAY.

1. *General Features.*

THE term "New World" has not yet lost its significance and applicability to that vast region of North America, known as the "North-West Territories," whereof the "Old World" has remained in comparative ignorance until within the last few years, since which time they have been introduced to notice in connection with the Dominion of Canada.

In 1670, as already stated, the Hudson Bay Company obtained a charter from Charles II., granting them a limited sovereignty, with territorial rights and a monopoly of trade over the country drained by the rivers which fall into Hudson Bay. Under this charter the Company claimed jurisdiction and control over all the territories between the watershed of the St. Lawrence Basin and the Arctic Ocean, and from the Labrador coast to the Rocky Mountains. Their trade was directed from England, and the route adopted for communication with the country was *viâ* Hudson Strait.

Under the French *régime* the claim of the Hudson Bay Company to this territory was disputed by the French traders, who had their base of operations in Canada, and so fierce was the rivalry that constant war ensued.

The Hudson Bay Company found the fur trade, to which they chiefly confined their operations, very lucra-

tive, and made great efforts to maintain their monopoly *in silence*, and to prevent all intruders from entering the Territories, or interfering with the Indian hunters whom they had in their service.

Subsequently to the conquest of Canada by Great Britain, the British colonists, attracted by the fur trade of the interior, organised a company with its headquarters in Montreal, and known as the "North-West Company," which prosecuted this trade so vigorously that, to avoid the rivalry of the opposing company a union was effected with the North-West Company in 1793, and the original policy of exclusiveness was maintained more rigorously than before.

In the arctic explorations of Hearne, Mackenzie, Simpson, and Dease, the Hudson Bay Company contributed much to geographical knowledge; but the narratives of hardships and sufferings endured by these explorers gave ground for the impression of the severity of the climate, erroneously imputed to the entire area of these Territories.

One, and only one, agricultural settlement was permitted by the Company. The failure of this one, undertaken by the Earl of Selkirk and a colony of Scotch Highlanders about the year 1812, on the banks of the Red River within the present Province of Manitoba, was utilised to discourage agricultural settlements, and the Company is charged, with some reason,—if their statements before the Committees of the British House of Commons in 1857 be referred to,—with the cultivation of the idea that the climate was arctic and the land sterile.

Thus, for two centuries, these Territories were retained for the exclusive uses of the Company—a great "lone land"—untenanted except by the scattered trading posts of these fur traders, and undisturbed, unless by the roving Indian hunter following the musk ox or the buffalo.

At the present day it may be stated, on the evidence of facts and the returns of the settler, that this prairie section of Canada, instead of being an arctic waste, is the most valuable and fertile part of the New World, and possibly equal to any part of the Old one.

As already stated, the area between the coast of Labrador and the eastern slope of the Rocky Mountains, including the islands of the arctic coast and the water surface of Hudson Bay, exceeds 3,000,000 square miles. The country is a plateau, rising in terraces from the Atlantic coast to the Rocky Mountains.

The soil is alluvial, underlaid with gravel, and has a covering of rich mould, varying from a few inches to ten feet, formed by the decay of the grasses and of the ashes, to which they have been reduced by the fires that have for ages annually mown and bedded them under.

Occasional tracts, large in themselves, but small in comparison with the whole, are sandy or sterile, and again some are wet and will continue so until drained, as may easily be effected through the deep eroded channels of the rivers cut in these alluvial plains.

One-third of these Territories may be stated to be as well adapted for the habitation of the human race as England, and, notwithstanding the erroneous opinions expressed by a few members of the British House of Commons in the debate on the Irish Land Bill, are much more salubrious than any part of Great Britain, and as fertile as its highest cultivated districts. The remainder corresponds with Russia in similar latitudes, but is better timbered, and is in great part underlaid with coal.

In 1869, at the urgent solicitation of Canada, the Imperial Government obtained from the Hudson Bay Company a surrender and transfer of their rights. The terms agreed on were £300,000 sterling, to be paid by Canada, the loan for the purpose being guaranteed by the

Imperial Government, and a land grant of about *seven million acres* in the great fertile belt, together with valuable blocks around each of their established forts and trading posts.

The transfer was completed on the 1st October 1869, and these two impediments existed to the settlement of these Territories:—

The first was a dread of Indian hostility.

The other was the difficulty of access.

The first of these, as will be shown elsewhere, has ceased to exist, and the second is being rapidly overcome by the railways now in course of construction.

Until these are completed through Canadian territory the influx of immigrants will be necessarily limited. With this transfer the care of the Indian population and the recognition of their rights in the soil was assumed by Canada.

Subsequently treaties were effected by the Canadian Government with the several Indian tribes, as stated in the chapter on Indians, by which their title to the whole of the Territories was purchased on condition of perpetual annuities to them and to their children, and reservations of sufficient agricultural lands for their support.

By this just and politic arrangement the Indian is now settling down as an agriculturist, and has already made progress in the arts of civilisation, which will, it is believed, increase with each generation; and thus has the Indian been rendered the friend and not the foe of his white brother, and the attached ally of his great mother the Queen of Britain, and the Empress not only of the East but of the West.

The territory around Hudson Bay has been already in part described, and our attention will be now chiefly directed to the prairie region between Hudson Bay and the Rocky Mountains.

But few persons know anything explicit or tangible of

the immense region called the "North-West Territory." If we define it as the region westward from Lake Superior to the Rocky Mountains and northwards from the boundary to the 60° parallel, it includes 500,000 square miles of this continent, a territory equal to the British Islands, France, and Germany combined. The great North-West, however, is not the *terra incognita* it was a few years ago. Its vast plains have been traversed; its rivers and lakes carefully traced, and treasures of iron, and coal, salt, and even gold, have been laid bare; and its rich expanses of fertile prairies are now known to possess the capability of supporting a numerous population, equalling in numbers those now densely thronging the British Isles. What are the agricultural capabilities of the great region drained by Lake Winnipeg is very clearly stated by Professor Hind, who made a very able report on the subject not long since. He gives us the following statistics on the subject:—

	Acres.
On the route from Fort William, Lake Superior, to the Lake of the Woods, including the valley of Rainy River	200,000
The fertile belt, stretching from the Lake of the Woods to the flanks of the Rocky Mountains, and as far north as the 54th parallel, on the Athabasca, west of M'Leod River (80,000 square miles)	51,200,000
Isolated areas in the Prairie Plateau, south of the Assiniboine	2,000,000
Isolated areas in the great Plain Plateau, the extension northwards of the great American desert, and in the valleys of the rivers flowing through it	1,000,000
Total area of land available for agricultural purposes	54,400,000
Approximate area suitable for grazing purposes	30,000,000
Total approximate area suitable for the abode of civilised man	84,400,000
Approximate area of the basin of Lake Winnipeg, within British territory	199,680,000
Area fitted for the abode of civilised man	84,400,000
Desert area unsuitable for the permanent abode of man	115,280,000

Comparing this extent of surface with Canada, we arrive at the following results:—

	Acres.
Area of the province of Canada (340,000 square miles)	117,600,000
Area occupied by the sedimentary (80,000 square miles)	51,200,000
Area occupied by Crystalline rocks	166,400,000
If we suppose that one-sixth of the area occupied by crystalline rock is capable of cultivation, as regards soil and climate (an estimate probably in excess), the total amount of land in Canada available for the purpose of settlement will be approximately	78,900,000
Showing an excess of land fitted for the permanent abode of men in favour of the basin of Lake Winnipeg over the province of Canada of	5,500,000

The first regular survey of this prairie section was made by Captain Palliser, R.E., in the four years from 1857 to 1860, under the direction of the Imperial Government. His reports and maps are interesting, and should be consulted by any one seeking information as to the details of the country. The subsequent surveys for the Canadian Government by the officers of the Geological Survey, and of the Department of the Interior, as well as for the Canadian Pacific Railway, have materially increased our knowledge of the country, and corrected many erroneous ideas entertained even lately as to the sterility of certain sections supposed to be arid or swampy.

Sandford Fleming, C.E., says, in his first report on the proposed railway route:—

"A glance at a map of North America will show that the field of inquiry extends from 76° west longitude on the eastern side, to 120° west longitude on the western side, while it is bounded on the south by the 45th parallel of latitude, and on the north by the 55th parallel.

"Its extreme limits thus embrace fifty-four degrees of longitude, and ten degrees of latitude, and, reduced to miles, the territory under examination will be found to

cover fully 2700 hundred miles in length, and a breadth ranging from 300 to 500 miles.

"This extensive territory, with an area of 1,000,000 square miles, drains into three oceans—the Atlantic to the east, the Arctic to the north, and the Pacific to the west. . . .

"The leading botanical, in conjunction with the geological and topographical, features of the country divide it naturally into three great regions. The Eastern is densely wooded; the Western is wooded and mountainous; the Central is a vast lowland plain, for the most part prairie."

Respecting the Central or Prairie Region, Mr. Fleming states that it may be described as an isolated triangle with a base of 1500 miles in length, and sides of from 900 to 1000 miles:—

"This vast triangle, containing about 300,000,000 acres, may be described generally as a great plain, sloping gently downwards from its apex to its base. Its apex at the foot of the Rocky Mountain chain, between the sources of the Missouri and the South Saskatchewan, is estimated to be about 4000 feet above sea-level, while its base, lying along the series of lake expansions from Lake of the Woods to Great Slave Lake, will not, it is believed, average a higher elevation than 900 or 1000 feet above the sea.

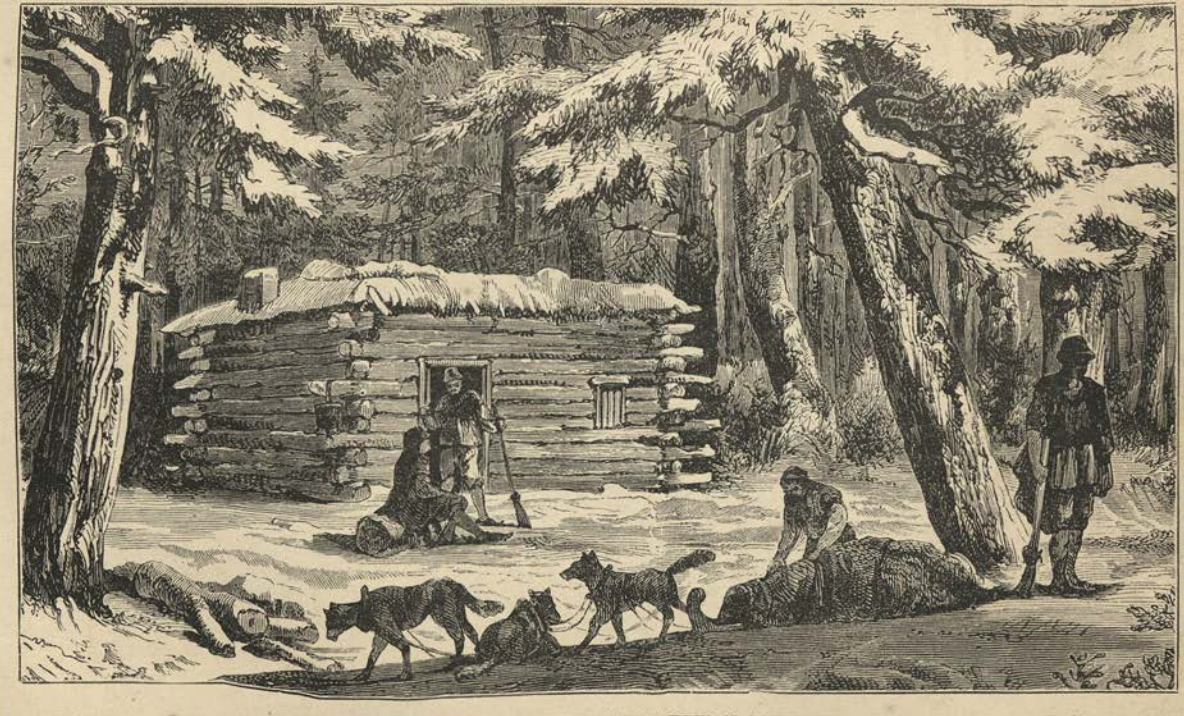
"The river systems, which carry off the water-flow of this long sloping plain, are the Assiniboine, the Saskatchewan, the Athabasca, and the Peace. The first two unite their waters in Lake Winnipeg before finally passing out through the Nelson River to Hudson Bay. The last two are tributaries of the Mackenzie, and, through the channel of that river, ultimately reach the Arctic Ocean. Between the Saskatchewan and the Athabasca the river Churchill takes its rise, and flows independently in a generally north-eastern course, falling ultimately into Hudson Bay.

"All the rivers of this division of the country flow for a great part of their length in deeply eroded channels, frequently of considerable width, and, as the materials underlying the plains are for the most part drift or soft rock formation, the channels which have been furrowed out are not much obstructed by falls or dangerous rapids, but generally present, from the base of the mountains throughout the greater part of their course, a uniform descent.

"The prairie land passes into woodland in various localities to the north of the Saskatchewan, to reappear in higher latitudes. On Peace River there are extensive prairies with extremely rich soil. In other localities there is an agreeable mixture of woodland and prairie, and this character of country appears to prevail as far as Hay River, 400 miles to the north of the river Saskatchewan.

Hurlbert, in his valuable physical atlas of the Dominion, classifies these Territories according to their productive character, and has exemplified by maps the prairie, the forest, and the desert lands, again showing the zones of—(1) conifer and mixed forests; (2) of wheat, barley, rye, oats, pease, root crops, and vegetables; (3) of maize and grapes; and (4) of orchard and smaller fruits —to which we can only briefly refer, and must direct the attention of any one seeking fuller information to the work itself.[1] He says, "North of the parallel of 49°, east of the Rocky Mountains, there are about 120,000 square miles of prairie, an area equal to Great Britain and Ireland. Between this and the North Saskatchewan the prairie land predominates, but is interspersed with groves. North of the Saskatchewan the forests predominate, there being not more than one-third prairie.

[1] *Physical Atlas of the Dominion of Canada*, by J. Beaufort Hurlbert, M.A., LL.D. 1880.



A WINTER HUT IN THE SASKATCHEWAN COUNTRY.

To face page 384.

Along the eastern base of the Rocky Mountains, and extending up into the recesses of the mountains, is a belt of conifers, the principal trees being the Douglas pine (this tree, is, however, an *Abies*), and the white and black spruce. East of these mountains the watersheds are mostly covered with heavy forests of spruce, but on the dry ground there are trees, with poplars (*Populus tremuloides*). In the damp forest lands near the mountains balsam poplar is found in abundance, and this is the species which grows to such an enormous size on the Athabasca, Peace, and Mackenzie Rivers; all the islands in these rivers being covered with trees of this species, often seven to ten feet in diameter, and 100 feet in height.

"In the interior of the continent, where the summer temperatures range from 60° to 80°, with somewhat uniform summer rains, are found the great mixed forests of North America, the most remarkable forests of deciduous and coniferous trees on the globe.

"Most of the grains and vegetables of the middle temperate zone come to maturity wherever planted in the country to the south, east, and west of James Bay; but, judging from the temperature and rainfall, no doubt that entire region would be best adapted for pasture and meadow lands.

"The pastures and meadows, with their accompanying flocks, herds, and the dairy, have a value equal, if not superior to, the cereals. . . . The pasture-lands of Canada must assume in the near future an importance scarcely to be over-estimated.

"Taking as our guide the temperatures and rainfall, the existence of native grasses, and the analogy of Europe, we are justified in the inference that the cultivable grasses in the Dominion would extend over more than 2,000,000 square miles, or more than twelve hundred millions of acres.

"The northern limit of wheat is about 58° north latitude. . . . Hence the immense areas in the north-west in Canada favourable for wheat. South of the northern limits, where wheat has been found maturing, east of the Rocky Mountains, and west of Ontario, there are some 950,000 to 1,000,000 square miles in these North-West Territories of Canada. . . . It lies, too, in the valleys of the great rivers of the northern half of the continent—the Saskatchewan, Assiniboine, Red, Winnipeg, Peace, Athabasca, and Mackenzie—with probably a larger percentage of tillable soil than any equal area in the Old World.

"As barley and rye ripen four to five degrees farther north than wheat, there are at least half-a-million of square miles more land adapted to these grains than to wheat in the North-Western Territories of the Dominion.

"Macoun found oats in latitude 56° four feet high, barley of nearly equal growth, wild grass three feet.

"Flax is a splendid crop in Manitoba. Wild hops grow luxuriantly in the valley of the Kaministiquia, west of Lake Superior, latitude 49°, also in the valleys of the Red River, the Assiniboine, and the Qu'Appelle.

"The polar limits of the potato are beyond those of barley, and turnips will go to even a higher latitude than the potato.

"On the Peace River, latitude 56° 12′, and 1600 feet above the sea, Indian corn had ripened three years in succession (Professor Macoun's evidence before the Committee of the Dominion House of Commons, March 1876).

"Dr. Richardson found the wild vine in latitude 52°, and Professor Macoun found it on the Assiniboine north of Fort Ellice, east of the 100th meridian, and as high as the 51° parallel, where it produces excellent fruit."

Speaking of apples and wild plums, he says: "The analogy of Europe would justify us in placing the

northern limits of these two fruits as high as the parallel of 60°."

The northern boundary of the smaller fruits—strawberries, raspberries, currants, cranberries, and two kinds of cherries—may be placed as high as the grasses, and over the vast regions of the interior co-extensive with the pastures and meadows.

In the beginning of 1881 Sir Alexander Galt, in referring to the north-west and territorial jurisdiction, says: "Already, though Winnipeg has only had railway communication with the United States for less than two years, it has sprung from a population of a few hundreds to upwards of ten thousand. Manitoba, without roads, without capital, and in spite of every possible misrepresentation as to its climate, has gone forward by 'leaps and bounds,' within the last four years, and now counts its 75,000 inhabitants. Settlers, eager to press on to even more favoured regions, are now dotting the trail across the prairie with their farms in every direction. Villages are springing up many hundreds of miles west of Winnipeg; churches are being built; mills to grind the future crop are having their steam-engines wearily dragged across the plains. Even at the very base of the Rocky Mountains herds of cattle are now being raised on the rich pastures of the affluents of the Saskatchewan, for which a market is to be found in the advancing tide of settlement. From one end of the country to the other there is the evident commencement of one of those great movements of population that have from time to time signalised the progress of the American continent. The gigantic efforts now being made to further the colonisation of the Canadian Far West are promoted and seconded by the wise and liberal public policy in respect to the land. By Act of the Dominion Parliament, one-fourth of the whole public domain in the North-West

Territories is devoted absolutely to free grants to actual settlers, another fourth is held at their option for three years at one-half the Government selling price, and the remaining one-half is to be sold at prices varying from 4s. to £1 per acre to reimburse the cost of the Canadian Pacific Railway. When it is remembered that the district thus being opened up exceeds in area 250,000,000 of acres, it will be seen that the free grant lands alone are nearly twice as extensive as the whole of England. Let me pause for one moment to answer the objection that I have seen occasionally urged against the policy England has pursued in transferring her territorial right to her colonial subjects. This very territory that I have endeavoured most inadequately to describe was for upwards of two hundred years within the jurisdiction of England herself, and has only been made over to Canada within ten short years. Admitting that its capabilities were then unknown, Canada can at least claim the credit of diffusing this knowledge; but if this be denied her, let me ask whether English taxpayers would ever have consented to do what Canadians are cheerfully undertaking? What Chancellor of the Exchequer would have ventured to propose a vote of £11,000,000 sterling for a railway to open up such a remote country? What English Government would for years have sustained the burden of introducing government and law and order? And even in the case of the Indian tribes, what statesman would have been bold enough to tell the people of England that for years to come they must provide £200,000 a year to save these wretched natives from starvation? Yet all this, and far more, has been done by Canadian statesmen, and cheerfully acquiesced in by the Canadian people; while one-fourth of the whole domain, acquired and developed at the sole charge of the Canadian taxpayer, is now offered free to all their English brethren who

choose to come. Nor must I confine myself to these records of successful progress. Already Canada is among the first of the great carriers of the world; her ships are found in every sea, from every frequented seaport they bear the produce of other lands to market. Her trade is no longer with England and the United States alone, but extends to the East, to Australia, the West Indies, and South America. Within the present year a steamship line, jointly subsidised by Brazil and Canada, will open the markets of that vast empire to the products of Canadian industry. Similar arrangements, it is confidently expected, will result from negotiations now in progress with Spain for trade with the Spanish West Indies. And if further evidence be asked of the growing importance of the Dominion, it will be found in the fact that both the late and present Governments of England have recognised the propriety of making exceptional arrangements in future treaties of commerce with foreign countries for the Colonies; and in the negotiations now proceeding with France and Spain, the interests of Canada will be watched over by her own representative, and determined by her own Government. Such, in brief, is the position of Canada to-day, and such the population and resources with which she is about to address herself to the stupendous task of colonising the whole interior of North America lying north of the United States, and stretching for upwards of 2000 miles from Lake Superior to the Pacific Ocean."

Unless the prairies have been seen, very hazy ideas are entertained of their general appearance; and with a view of affording clearer notions on this subject, an extract is here quoted from the graphic and suggestive lines of the poet Bryant—lines unsurpassed for their beauty.

This is done in spite of Dr. Johnson's opinion that anything can be stated in prose better than in verse.

Possibly he held "likewisely," that music is best rendered on a cow horn. He was fortunately in the minority on these points.

The Prairies.

These are the gardens of the Desert, these
The unshorn fields, boundless and beautiful,
For which the speech of England has no name;
The Prairies. I behold them for the first,
And my heart swells, while the dilated sight
Takes in the encircling vastness. Lo! they stretch
In airy undulations, far away,
As if the ocean, in his gentlest swell,
Stood still, with all his rounded billows fixed,
And motionless for ever.—Motionless?—
No—they are all unchained again. The clouds
Sweep over with their shadows, and beneath,
The surface rolls and fluctuates to the eye.
Dark hollows seem to glide along, and chase
The sunny ridges. Breezes of the south!
Who toss the golden and the flame-like flowers,
And pass the prairie-hawk that, poised on high,
Flaps his broad wings, yet moves not—ye have played
Among the palms of Mexico, and vines
Of Texas, and have crisped the limpid brooks
That from the fountains of Sonora glide
Into the calm Pacific;—have ye fanned
A nobler or a lovlier scene than this?
Man hath no part in all this glorious work:
The hand that built the firmament hath heaved
And smoothed these verdant swells, and sown their slopes
With herbage, planted them with island groves,
And hedged them round with forests—fitting floor
For this magnificent temple of the sky—
With flowers whose glory and whose multitude
Rival the constellations! The great heavens
Seem to stoop down upon the scene in love—
A nearer vault, and of a tenderer blue,
Than that which bends above the eastern hills.

As o'er the verdant waste I guide my steed,
Among the high rank grass that sweeps his sides,
The hollow beating of his footstep seems

A sacrilegious sound. I think of those
Upon whose rest he tramples. Are they here—
The dead of other days—and did the dust
Of these fair solitudes once stir with life
And burn with passion?

. . . . . .

Still this great solitude is quick with life.
Myriads of insects, gaudy as the flowers
They flutter over, gentle quadrupeds,
And birds, that scarce have learned the fear of man
Are here, and gliding reptiles of the ground,
Startlingly beautiful. The graceful deer
Bounds to the wood at my approach. The bee,
A more adventurous colonist than man
With whom he came across the eastern deep,
Fills the savannas with his murmurings,
And hides his sweets, as in the golden age,
Within the hollow oak. I listen long
To his domestic hum, and think I hear
The sound of that advancing multitude
Which soon shall fill these deserts. From the ground
Comes up the laugh of children, the soft voice
Of maidens, and the sweet and solemn hymn
Of Sabbath worshippers. The low of herds
Blends with the rustling of the heavy grain
Over the dark brown furrows. All at once
A fresher wind sweeps by and breaks my dream,
And I am in the wilderness alone.

2. *The Saskatchewan River.*

The term country is more properly applicable than valley to the region drained by the Saskatchewan and its tributaries. The country through which the two great arms of the Saskatchewan have their courses being a portion of the great interior plateau that slopes eastward from the Rocky Mountains, it does not present the aspect of a valley. The term valley is more appropriately applicable to the deep hollows in the generally plain country in which its rivers flow.

The north and south branches of the Saskatchewan

have their sources in the Rocky Mountains, but a few miles apart, about latitude 51° 40′ north. From their nearly common source the North Branch diverges north-eastward, and the South Branch or Bow River, south-eastward, till, at 250 miles due eastward, they attain a distance of 300 miles from each other; the South Branch being there within 75 miles of the frontier. Then, gradually approaching, they meet at 550 miles eastward from their source.

The length of the North Branch, by the manuscript field notes of the survey of it by the North-West Company's astronomer, David Thompson, is 772½ miles, and that of the South Branch, by the latest maps, is about 810 miles.

From their junction, the course of the main Saskatchewan to Lake Winnipeg is, by Thompson's field notes, 282 miles. This makes the whole length of the Saskatchewan, from the source of the South Branch (which is the main stream) to Lake Winnipeg, 1092 miles. Following the North Branch, as measured by Thompson, the total length to Lake Winnipeg is 1051½ miles.

Passing through the north end of Lake Winnipeg at 423 miles farther, the Saskatchewan falls into Hudson Bay, making its entire length from its source to the sea 1515 miles. In this last distance its waters are more than doubled in volume from the large tributaries that feed Lake Winnipeg; and as it descends 628 feet, its course is exceedingly obstructed by rapids and falls. The total area drained by it is 500,000 miles.

By the careful measurements of Mr. Fleming, of the Canadian Exploring Expedition, the volume of water passing in the North Branch, in the month of August, was 25,264 cubic feet per second, or one-fifth more than the mean volume of the Rhone, by D'Aubuisson; and that of the South Branch was 34,285, or 585 cubic feet more than the mean of the Rhine, by the same authority.

Measured below the forks, where it is 980 feet wide and twenty feet in average depth, that of the main Saskatchewan was 59,667 cubic feet per second, or nearly three-quarters of the mean discharge of the Ottawa at Grenville.

In considering the character of the Saskatchewan and its country, as described by the Canadian exploring party, and others, let us ascend it from Lake Winnipeg.

From its mouth there are over two miles of strong current, up to the Grand Rapids, which are nearly three miles in length, with a descent of forty-three and a half feet. The river has there worn its channel, varying from 660 to 220 yards in width, down through the horizontal beds of limestone which form the basis of the level and generally marshy plateau behind.

The second rapid referred to is four miles above the head of the Grand Rapid. It is fully a mile long, with a fall of seven and a half feet. From this up to Cedar Lake, which is twenty miles from Lake Winnipeg, there is a succession of rapids and swift currents, which, with the rapids already mentioned, make a total descent of upwards of sixty feet.

Cedar Lake is thirty miles long, and twenty-five miles in greatest width. From the foot of it the river is navigable for steamers, without interruption, 180 miles up to Tobern's Rapids.

North of Cedar Lake the country is described as low and flat for a long distance back; the mainland and islands well wooded with balsam, spruce, birch, poplar, tamarack, cedar, and Banksian pine.

From Cedar Lake up to Marshy Lake, about forty miles, the country on each side of the river is not more than eighteen inches over the water, which is skirted by a belt of willows, alders, and long grass; in the rear is an extensive marsh, with occasional islands of small poplar

and spruce. The floods cover these flats every spring, depositing a very rich mud. No high ground is to be seen on either side.

The Pas Mission is situated at the mouth of the Pasquia, a considerable tributary. The river banks are there ten or twelve feet high; the soil a dark mould over drift clay. The banks, however, continue low alluvial, with a rather low country behind.

Around Cumberland House (about 116 miles farther) the country is low and flat; much of it is submerged in spring floods. Many of the marshes could be drained and improved without much difficulty.

Here we have reached a very favourable country for agricultural purposes. Speaking of the twenty-nine miles above this, Mr. Fleming says: "The general character of the country we have passed through to-day is excellent, the soil being rich and the timber of a fair quality." Of the succeeding forty-seven miles upwards, he says he "passed through an excellent tract of country all day, the soil on both sides of the river consisting of a very rich alluvial deposit, ten feet in thickness above the water, well wooded with large poplar, balsam, spruce, and birch—some of the poplars measuring two and a half feet in diameter; and, as far as I was enabled to ascertain, the land continues good for a great distance on either side, but more especially on the south side of the river."

Of the next fifty-three miles he says that the land is "well adapted for agricultural purposes and settlements, the soil being a rich alluvial loam of considerable depth, well watered and drained by many fine creeks, and clothed with abundance of timber for fuel, fencing, and building."

The country on the banks of the river continues the same for a few miles farther, till, approaching Fort à la Corne, the immediate banks become gradually higher, and

the bluffs that form the edge of the high plateau behind on each side gradually approach nearer to the river.

From Fort à la Corne, which is 150 miles above Cumberland House, up to the forks of the north and south branches, a distance of sixteen miles, the river sweeps, in magnificent curves, in a valley of about a mile in width, and from 150 to 200 feet lower than the general level of the country on each side.

Describing the country on the south side of the Saskatchewan here, Professor Hind says: "The trail from Fort à la Corne to the old track leading from Fort Ellice to Carleton House ascends the hills, forming the banks of the deep-eroded valley of the Saskatchewan, in rear of the fort. It passes through a thick forest of small aspens until near the summit, when a sandy soil begins, covered with Banksian pine and a few small oaks. The sandy soil occupies a narrow strip on the banks of the river, varying from half-a-mile to four miles broad. South of the sandy strip the soil changes to a rich black mould, distributed over a gently undulating country. The pine gives way to aspen and willows in groves, the aspen occupying the crest of the undulation, and the willows the lowest portion of the intervening valleys. The general aspect of the country is highly favourable for agriculture, the soil deep and uniformly rich, rivalling the low prairies of Red River and the Assiniboine."

The South Branch of the Saskatchewan.

Immediately above the forks the South Branch of the Saskatchewan is only 180 yards in width, but the current is swift—three and a half miles an hour—and the average depth seven and a half feet.

For about 130 miles up its course its valley preserves the same character as that of the main river between the

forks and Fort à la Corne; but the banks which the prairie plateaus on each side present to the narrow valley of the river are generally lower, varying from 140 feet in height, exposing sandstone cliffs where cut by the bends of the river.

The country on each side has a rich soil, with abundant woods in clumps and groves for a great part of the way. It then becomes gradually less wooded and more sandy in parts, especially on the west side, till, after passing the distance last-mentioned, it assumes the character of light, treeless, prairie land. The river in this distance varies from 180 to 440 yards in breadth (increasing in width in ascending), generally from ten to fourteen feet in depth, the current three and three and a half miles an hour, with a swifter current and whirlpools in a few places.

The generally treeless prairie country, reached at 130 miles from the forks, is the commencement of the so-called great *infertile* region, extending westward over the South Saskatchewan and its tributaries nearly to the hilly country at the base of the Rocky Mountains.

Continuing about seventy miles farther in the same south-west direction, or nearly 100 miles by its course, the elbow of the South Branch is reached 210 miles from the forks. In the commencement of this distance is a rich alluvial expansion of the low valley of the river, called the "Moose Woods," partly wooded, with rich glades between. It is twenty-five miles in length, and six or eight miles in breadth, and bounded on each side by sandy-crested bluffs. From this to the elbow the river again assumes its narrow valley, the banks of which gradually ascend to 200 feet in height.

About thirty-five miles above the elbow the South Branch approaches the Eyebrow and Thunder-breeding Mountains, and there skirts the salient angle of the

Coteau Missouri, which springs like a vast bastion from the United States boundary. Its east face, which rises 600 feet above the elevated plain at its foot, is 200 miles in length; and its western face, called the Cypress Hills, extends 160 miles, with much greater elevation, being, according to Dr. Hector, 4200 feet above the sea.

For nearly 500 miles above the elbow of the South Saskatchewan, its upward course passes through the great *infertile* region of light prairie land, the greater part of which is described as consisting of arid wastes, from which, however, there are apparently some large exceptions; for instance, the Cypress Hills, covered with fine timber, abounding in excellent grass and well watered, and fairly, though not abundantly, stocked with game.

The following extracts from notes by Professor Macoun, M.A., F.L.S., the well-known explorer and botanist, are taken from the Report of the Minister of the Interior, 1880, and describe portions of the north-west over which the professor has passed during the last year:—

"Taking the Qu'Appelle at its mouth as a centre, and projecting a line nearly due west to the South Saskatchewan, a distance of over 250 miles, and starting at the meridian of Fort Ellice, and including only the land south of the Touchwood Hills, a belt with an average breadth of 100 miles extends right up that river. Here we have 25,000 square miles or 16,000,000 acres of land lying in one block, that, to my own knowledge, has over 90 per cent of it fit for agricultural or pastoral purposes. The only poor soil in this extensive tract is that portion between Spy Hill and Fort Ellice, and two small groups of sand-hills lying at the sources of the Qu'Appelle. No alkaline soil is known on any part of it, except a narrow tract extending from the head of Long Lake toward Quill Lakes. Numerous small brooks are found on both sides of the river, and where these are not seen ponds of good water

are seldom wanting. There will be no difficulty in obtaining first-class wheat crops throughout the greater part of it, as the soil is generally a rich black loam, mixed with silica, and at times containing more or less gravel. The subsoil, in nearly every case, is a light-coloured clay, or clay and gravel coated with carbonate of lime. Nearly the whole of the surface is a gently undulating plain, easily drained, and over three-fourths of it sloping to the south. The crops at the Qu'Appelle Mission, about the centre of the area, ripen earlier than in any other part of the North-West; barley having been cut both in 1879 and 1880 during the last week in July. No summer frost has ever been reported from this region, and authentic reports say that the spring is two weeks earlier than at Winnipeg. Forty miles west of the File Hills wood is no longer found, and from that to the Saskatchewan not a bush of any description is seen."

As to game, he says: "After the middle of August we began to shoot ducks, and besides the species mentioned above, the Gadwell or Gray Duck (*Chaulelasmus streperus*) and Red-breasted Merganser (*Mergus serriator*) bred in numbers on the plains. Coots or Mud Hens (*Fulica Americana*) and Pied-Billed Grebe (*Podilymbus podiceps*) were in great numbers, and afforded fine sport. We had to wade almost up to our neck to obtain our specimens, as they were very difficult to kill, owing to their diving power.

"After the middle of September the sea-ducks began to arrive, and it is no figure of speech to say that the ponds and lakelets were alive with them. For the following six weeks feathered game of every kind were so abundant that any person in a week could have shot enough ducks and geese to have lasted a family all winter. The abundance of water-fowl in the interior is of such importance at this time, when Indians are being fed by

the Government, that they should be compelled to lay in a stock of food for themselves during the winter. To see hunters perishing of hunger, or living on supplies furnished by the Government, and at the same time surrounded by millions of birds, is a paradox; but these men carry rifles, and bird-shooting to them is a small business after buffalo hunting. Within a day's journey of the Cree Reserve, on the north side of the Cypress Hills, is a large lake, named by me Gull Lake, that during the last days of August was literally alive with birds; and when one shot was enough to supply six of us with a dinner, yet these Indians were largely depending on the Government rations at this time, and Colonel M'Donald could scarcely persuade some of the young men to go and kill a few ducks, by liberal offers of powder and shot. At the Assiniboine Reserve it was just the same,—plenty of birds in the neighbourhood, but scarcely any attempt made to shoot them, as the men preferred Government rations to independence. Rifles to-day are of little value to the plain Indians, and they should be required to exchange these for shot guns at an early day.

"Geese, ducks, and prairie chickens are taking to the stubble fields in the fall, so that no difficulty will be found by incoming settlers to lay up a supply of fat fowl for the winter. About forty species of game birds were either shot or seen on the prairie, and it is very probable that many species were not observed, as we were far east of the main migrating lines. All birds shot were fat; and soup made from the various species of snipe and plover was considered a great dainty. The value of the bird crop, after the railroad is built, will be enormous, but the destruction of eggs in the spring by Indians must cease. None but those who reside in the interior, or have been there in the autumn, can realise the number of birds living or passing through it at that season."

In his botanical notes he says:—

"A voyager on the Assiniboine in the ascent from Winnipeg to the Grand Valley cannot but remark the paucity of species in the river valley as regards trees. It is true he sees familiar forms, but many Eastern species are wanting, and he looks in vain for beech, maple, or pine, and only occasionally does he see oak or ash. Poplar and elm, with willows which sometimes attain to the size of trees, make up the bulk of the wood; while roses (*Rosa blanda*) and Pembina berries (*Viburnum Lentago*) form almost impassable thickets. The Ostrich fern (*Struthiopteris Germanica*) is occasionally very abundant, and attains a great height, and all herbaceous vegetation is astonishingly luxuriant. Climbers too are not wanting, and wild hops (*Humulus Lupulus*), wild balsam apple (*Echinocystis lobata*), hedge bindweed (*Calystegia sepium*), wild grapes (*Vitis riparia*), and Virginia creeper (*Ampelopsis quinquefolia*), are either quite common or occasionally seen. Berry bearing shrubs are not rare, as thickets of wild plum (*Prunus Americana*), raspberry (*Rubus strigosus*), service berry (*Amelanchier alnifolia*), high bush cranberry (*Viburnum Opulus*, and *pauciflorum*), wild cherry (*Prunus Virginiana*), and white thorn (*Cratægus coccinea*), are very common, and all bear abundance of well-flavoured fruit. Gooseberries (*Ribes oxycanthoides*), wild black currants (*Ribes floridum*), and red currants (*Ribes rubrum*), are abundant in the valley, the two latter where the soil is wet, the former on the drier slopes. A beautiful western shrub, the Buffalo berry (*Shepherdia argentea*), is occasionally met with on the Assiniboine, but it is only on the Saskatchewan that it is seen in its beauty. A near congener, the silver berry (*Elæagnus argentea*), is abundant on the drier slopes, and throughout Manitoba is said to indicate good soil; in reality it is only an indicator of a dry one. These two shrubs are well worthy of cultivation, being perfectly

hardy and having beautiful silvery leaves and sweet-scented flowers—the blossoms of the latter about the middle of June actually loading the air with their fragrance. Later in the season the former is loaded down with its close clusters of bright red acid berries, which we found to be an excellent corrective to salt pork when made into jelly and sweetened. The berries of the latter are of the same colour as the leaves, are quite mealy, and these, with rose hips, constituted the principal food of our so-called prairie chicken, though in reality the sharp-tailed grouse (*Pediocætes phasianellus*) during the fall and winter.

"On the more elevated country and along the banks of the river strawberries (*Fragaria Virginiana*) are very abundant, of large size, and fine flavour. While the steamer was wooding up on 16th June 1879, myself and other passengers climbed the hills, and obtained abundance of ripe berries at that early date. In many parts of the country strawberries are in such great quantities that it is no unusual thing to find the cart-wheels streaming with their juice.

"Besides the shrubs mentioned above, there are still a few that should not be passed without notice on account of their beauty. Foremost amongst these are the lead plant (*Amorpha canescens*), which was abundant at Portage La Prairie in 1872, and a smaller species, *Amorpha microphylla*, which is in some abundance at the rapids on the Assiniboine. Both these species are worthy of a prominent place in any of our gardens. Wild honeysuckle (*Lonicera parviflora*) and two species of snowberry (*Symphoricarpus racemosus* and *occidentalis*), with wild cornel (*Cornus stolonifera*) and downy arrow-wood (*Viburnum pubescens*), are found in more or less abundance in the river valley. The wild cornel or western kinnikinik is very abundant in the valleys of all

streams, and it is from the inner bark of this shrub, mixed with tobacco, that all the Indians of the plains and the half-breeds make the 'Harouge,' which they prefer to pure tobacco. The kinnikinik of the east (*Arctostaphylos Uva-ursi*) and the creeping juniper (*Juniperus Sabina var. procumbens*) are abundant on all sandy soil, and form the chief covering of the sand dunes and hills throughout the country. . . .

"The prominent flowers were three species of Penstemon (*P. gracilis, pubescens,* and *confertus var.*) Hedysarum boreale, Thermopsis rhombifolia, Gaura coccinea, Galium boreale, Sisyrinchium Bermudiana, Arnica angustifolia, and four species of Astragalus (*A. pectinatus, flexuosus, caryocarpus,* and *bisulcatus*). All of these would have been ornaments to any garden, and grew in such profusion that they gave a marked character to the landscape. . . .

"At the time we crossed the extensive plain lying between the Grand Valley and Moose Mountain (the latter part of June), the whole country was gay with beautiful flowers. The air was loaded with the perfume of roses and the Elæagnus, and every little mound was bright with the tall purple spikes of Oxytropus splendens and Lamberti, while the level prairie was dotted with patches of Arnica angustifolia, looking like the marigolds of our gardens. Even the marshes were beautiful with the nodding plumes of the cotton grass. (*Eriophorum polystachyon*), and their borders lined with Dodecatheon and the little yellow star grass (*Sisyrinchium Bermudiana*). . . .

"The grasses of the plateau were of the real pasturage species, and produced abundance of leaves, and were so tall that for miles at a time we had great difficulty in forcing our way through them. The chief were species of Festuca, Danthonia, Poa, Avena pratensis, Bromus,

and Phleum alpinum; and although their seeds were all ripe (August 4th), their leaves were quite green. . . .

"Throughout the whole country extending from Old Wives Lakes to the Cypress Hills, a distance of 100 miles due west, the pasture was always good and the grass of species noted for their nutritive qualities.

"At this time (August 28th) mushrooms became very abundant, and continued with us until the latter part of September, when the frosts became too severe, and prevented their growth. There were three species, all equally large and numerous, and, although we consumed great quantities of them, we never observed any ill effects from their use. There was one species, however, which was very large and more abundant than the others, which I did not touch, as I did not like its appearance, yet the usual test indicated it to be nutritious. While crossing the great plains north of the Qu'Appelle in July 1879, we found mushrooms by the cartload, and the past season we used them every day for three weeks while travelling at least 200 miles in an easterly direction. From the reports of other travellers and my own observations, I am led to believe that on nearly the whole prairie abundance of mushrooms will be obtained after any great rainfall during the summer. One species of Lycoperdon (Puff Ball) was seen that grew to a very large size, and numerous others were noticed during the whole season scattered over the plain in great profusion. No Lycoperdon is poisonous, and all are highly nutritious if gathered young, before the spores turn yellow, and cut into thin slices and fried. Were it possible to teach the Indians to discriminate between the good and bad mushrooms, immense quantities could be collected every year, dried, and stored away for future use, as is done in Norway. . . .

"In the valley of Strong Current Creek there were

numerous thickets of Shepherdia argentea covered at this time with its beautiful red and acid berries, and these, together with choke cherries (*Prunus Virginiana*), were eaten with avidity, and the former very much relished when boiled to a jelly and sweetened. Wherever the valley of the Saskatchewan was examined these species grew in profusion, forming at times impenetrable thickets and the fruit always palatable, the latter species never being astringent as it is in the east, but always sweet and pleasant. . . .

"Experience has taught me that wherever trees and brushwood are found there to look for a broken country and one that contains *too much* water, while the open treeless prairie generally condemned as sterile is by far the best farming land.

"In conclusion, I may state that the appearance of the country passed through was altogether different from what I expected, having been led to believe that much of it was little else than desert. Having crossed that part of it north of the Qu'Appelle in the summer of 1879, I can speak with certainty of the fertility of the immense plain sloping towards that river on both sides."

The Surveyor-General, Lindsay Russell, states in his report to the Minister of the Interior:—

"The area completely surveyed into townships, and ready for settlement and sale, was 4,472,000 acres; whilst an area of about 4,500,000 acres was partially surveyed—that is to say, had the block outlines and a portion of the township outlines laid out in readiness to begin the subdivision work of another year.

"Of the townships surveyed in the Souris and Turtle Mountain districts, the reports received are favourable in the extreme. It would appear from these reports, and from information received from the engineers exploring for railway lines westward, that the whole of this country

south of the Assiniboine and Qu'Appelle Rivers, as far west as the so-called Missouri Coteau, in longitude 105° W., may be considered as affording first-class land for settlement. It is not so well wooded as the districts on the north side of the rivers mentioned, but it is by no means anything like a treeless prairie. More or less wood is met with on the banks of every creek or streamlet, and on the range of hills called Moose Mountains quite a large quantity of timber is found."

Extremely favourable reports of the country traversed have also been received from the township outline surveyors in the district north of the Qu'Appelle River, and between the Assiniboine River on the east and the Touchwood Hills on the west. In this latter region more wood, and of better quality and dimension than was anticipated, was encountered.

In connection with the fuel supply for this part of the country, it may be of interest to mention that several barge-loads of lignite from the valuable deposits of that material on the upper waters of the Souris were floated down that stream and the Assiniboine to market at Winnipeg, by parties who had embarked in the enterprise under permission from the Department.

That portion of the special survey which consisted of the establishing of the Sixth Principal Meridian—that of 114° west longitude from Greenwich—was carried from Edmonton southward to the boundary line at a point about south of Fort Macleod, a distance of 350 miles.

The returns of the survey indicate, along the eastern slope of the Rocky Mountains, between the Bow River and Edmonton, and lying principally on the upper waters of that river, and of the Red Deer River, a beautiful tract of country both for cultivation and for grazing purposes, —one in which good rich soil is prevalent, where there is abundance of wood for all purposes of fuel and building,

and peculiarly adapted, by the richness of its grasses, and by the shelter afforded in the river bottoms, or in the openings among the mixed wood and prairie glades, for stock-raising farms.

The Honourable Minister of the Interior, Sir John A. Macdonald, K.C.B., states in this report that although it is, of course, an admitted fact that there are large prairie areas which are but indifferently provided with wood, yet the more the Territories are explored, the more apparent does it become that the timber supply is not so limited as was at one time supposed; that, properly husbanded, it is sufficient for all practical requirements; that within a reasonable distance of the treeless plains there is plenty of building and fencing timber which can be procured at no very great cost when the means of internal communication have been improved; and that on the north slope of the valley of the Saskatchewan River there are, easily accessible to the lumberer, continuous forests of fir-timber, for the manufacture and transportation of the products of which that river and its tributaries afford facilities.

The portion of the so-called American Desert which extends northerly into Canadian territory is proved to have no existence as such, for in the very worst parts of the country many tracts of good soil were found, and almost invariably the grass was rich and nutritive, offering excellent facilities for stock-raising. There is but one drawback to which Professor Macoun calls attention: the want of wood, for long distances. Lignite, however, underlies all this part of the Territories, the outcrops of which will furnish fuel; and the introduction of railways will enable settlers to obtain lumber supplies. Streams are not plentiful, but there is an abundant supply of water to be found everywhere by digging wells, and at no great depth.

The advantages offered by the North-West for stock-raising are now receiving that attention from capitalists and experienced cattle-breeders which they deserve. Already numerous applications, backed up by the most substantial proofs of the *bona fides* of the applicants, are before the Department, for leases of grazing lands in various sections of the Territories, and the purchase of the property on which to erect the necessary buildings. On the faith of a promise that his enterprise would receive every legitimate encouragement from the Government, one experienced Canadian agriculturist and stock-breeder of large capital, the Hon. Senator Cochrane, has gone to Great Britain with a view to an extensive purchase there of thoroughbred stock as the foundation of a ranch which he proposes establishing in the Bow River region. This ranch is now (1881) in full operation with 40,000 head of cattle and about 150 horses. It is hardly necessary to say how important it is to the future of that country,—how intimately connected with the development of its best interests,—that this and kindred schemes should be successful, and how much it will contribute to the convenience, profit, and prosperity of the settlers in this new land that they should find at once at their very doors the best breeds of cattle from which to stock their farms. To the pioneer farmers of Canada, and to all who have had any experience of the difficulty of procuring well-bred animals in new settlements, this is a point which will suggest itself as of the utmost possible consequence.

The most amicable relations continue to exist between the police and the Indians, and manifestations increase of growing confidence and good feeling on the part of the latter.

The North Branch of the Saskatchewan.

The country drained by the North Branch of the Saskatchewan and its extensive tributary, the Battle River, though incomparably more valuable than the country traversed by the South Branch, does not require so much description, owing to its more uniform character.

The North Branch, for the greater part of its course, and the Battle River, lie in the great belt of country which all authorities describe as generally fertile land of the first quality.

The North Branch, for 520 miles up from the forks, and the Battle River, for its whole course of 450 miles (excepting a short elbow of it), traverse a rich prairie country, more or less interspersed with woods.

The remaining 282 miles of the upper course of the North Branch lie in the thick wood country, which to the commencement of the mountains—about 200 miles—is represented as abounding in marshes, with patches of fine land in parts. In this distance the banks of the river display beds of lignite coal. Beyond it the remaining course of the river lies in the valleys of the mountains to the glaciers at its source.

The navigation of the Saskatchewan will probably prove to be nearly as useful as that of the Ohio, but less liable, on account of its greater volume, to interruption from low water, to which the navigation of the Ohio is very subject in the dry months of summer.

3. *The Nelson River.*

The largest of all the rivers entering Hudson Bay is the *Nelson*, which is one of the great rivers of the world. It is estimated to be about four times the size of the Ottawa at the capital. Its waters are muddy,

holding in suspension, all the way to its mouth, the fine-clay matter brought from the Rocky Mountains by the Saskatchewan.

Owing to want of information concerning these large rivers of British North America, and owing also to certain parts only having been explored as yet, a very general view must necessarily be taken. The following report by Professor Bell, of the Geological Survey of Canada, describes a section only of the Nelson River (1878).

The Lower Part of Nelson River.

"An exploration of the Nelson River was made for a distance of about ninety miles from the sea, following the stream. The shallowness of the water and the low monotonous character of the shores everywhere in this vicinity renders it difficult to draw a definite line between land and water. The mouth of the Haye's and Nelson Rivers are separated from each other by a low tongue of land called Beacon Point. Extensive shoals stretch for miles out from the extremity of Beacon Point and from the shores to the north and south of the estuaries of the two rivers. Owing to these circumstances, the outline between the land and water is widely different at high and low tide.

"The mouth of the Nelson River at high tide has a breadth of six or seven miles opposite the extremity of Beacon Point, but it contracts rapidly, having a trumpet-like outline, and for the first ten miles up the width is from three to four miles. It continues to narrow gradually to Seal Island at the head of tide-water, or twenty-four miles from the extremity of Beacon Point (at high tide), where it is only one mile and a half broad. Above this it varies from half a mile to a mile and a half as far as we went.

"When the tide is out the greater part of the space between the banks in the estuary of the river is dry, and consists of a dreary stretch of mud-flats dotted with boulders, constituting a continuation of the shoals farther out. A narrow channel with a somewhat irregular depth of water winds down the centre of the estuary. From the soundings which I took it appears to have an average depth of from two to three fathoms at low tide from a point abreast of Beacon Point for about twenty miles up. At the mouth of the river the ordinary spring tides amount to about twelve feet and the neap tides to about six feet, so that at a high tide, from three to five fathoms may be found throughout the above distance.

"The shallowest part of the river which we sounded was abreast of Gillam's and Seal Islands, or just where the tide ends and the proper channel of the river begins. Here the water was only about ten feet deep. But from this point upward, as far as we went, the average depth of the centre of the river was found to be twenty feet, and sometimes our soundings showed over thirty feet of water. In this section of the river, the velocity of the current varied from about two to six miles an hour, according to the experiments which were made with the submerged tops of spruce trees, in order to ascertain the rate, at least approximately. The swift parts are short, and the mean velocity may perhaps be taken at from two and a half to three miles per hour, and the average width at three-quarters of a mile between the water margins.

"A short rapid occurs a few miles below the highest point to which we explored the river, but it does not appear too swift to be surmounted by steamers. Above it the Indians report no obstructions for about fifteen miles, when a cascade, called Limestone Falls, is reached. The Nelson River may therefore be said to be navigable for river steamers to a distance of about 100 miles from the sea.

"The distance from York Factory to the extremity of Beacon Point is about five miles. In going towards the latter, the banks gradually diminish in elevation from twenty-seven feet at York Factory to the level of high tide at Beacon Point. They consist of stratified grayish clay combined with more or less fine sand. Below high tide the beach in the above interval consists of a muddy bluish clay with rounded pebbles and some boulders, and contains marine shells, which are tolerably plentiful.

"As already stated, the shores about the mouth of Nelson River are very low and flat. Banks of clay, at first only a few feet high, begin to appear on both sides about ten miles above the extremity of Beacon Point; and in ascending the river the banks of clay on either side gradually rise till a point is reached about fifty-four miles, in a straight line from Beacon Point, where they are nearly 200 feet in height, and above this, as far as observed, they maintain about the same elevation either immediately overlooking the river or at a short distance back from it. A layer of peat, averaging about four feet in thickness, was observed almost everywhere at the top of the bank on either side and extending inland. At Flamborough Head, a prominent point on the north-west side, nineteen miles from Beacon Point, the clay bank has attained a height of 126 feet. It consists of hard gravelly drift clay with some boulders at the bottom, and drab-coloured stratified clay towards the top.

"No islands occur in the estuary of the river, but from the head of tide, in the distance to which I ascended, upwards of twenty, covered with timber, were passed, besides a number of others on which only grass was growing. The wooded islands are comparatively high, while the grassy ones are low and flat, and are evidently swept over by the river ice when it breaks up in spring. From the Puck-wa-ha-gun River (sixty miles from Beacon

Point), upward wide flats covered with good grass occur, here and there, on both sides of the river. The grassy islands and flats probably owe their preservation to the underlying horizontal beds of dolomite, which prevent them from being worn away by the force of the ice.

"A slight rapid occurs near the highest point reached. Below it the river is narrower than it is above, and here there is evidence of great ice-packing in the spring. On the sloping bank on the north-west side, the timber is prevented from growing below forty-five feet above the river. The outermost trees, standing on this level, are barked by the ice and boulders which have been pushed diagonally up the slope. A great amphitheatre is excavated in the opposite bank, evidently by the water passing a temporary dam of ice, blocking up the river by piling at this point, after a spring shove. On the 18th of July 1878 some ice still remained on the north-west bank, opposite to this amphitheatre-like excavation, but was melting rapidly under a hot sun.

"The timber along the lower part of Nelson River consists principally of spruce, tamarack, aspen, and balm of Gilead. On the islands and lower levels the spruce attains a good size, and would be very suitable for building purposes; but on the level ground, stretching away from the tops of the banks, the timber is smaller, and the ground is covered with a thick growth of sphagnum, under which a layer of peat, of variable thickness, is seen at the brink of each steep clay bank.

"The region through which the upper two-thirds of the *Nelson River* flows may be described as a tolerably even Laurentian plain, sloping towards the sea at the rate of about two feet in the mile. The river, for the first 100 miles from Great Playgreen Lake, does not flow in a valley, but spreads itself by many channels over a considerable breadth of country. This tendency to give off

'stray' channels is characteristic of numerous rivers throughout the northern and comparatively level Laurentian regions, but it is perhaps more strongly marked in the Nelson than in any other. In the above section of this stream the straggling channels are of all sizes, from mere brooks up to large rivers. In their various courses towards the sea these channels here and there unite either wholly or partially, but often only to divide again, and thus they constitute a sort of network of rivers, the islands between them being of all sizes and shapes. The channels themselves consist of a series of dead-water stretches, separated by chutes or rapids at longer or shorter intervals, which, however, vary much in the different channels. The greatest descent at any one of the chutes visited takes place at the White Mud Falls, and amounts to twenty feet. These falls are divided by islands into three parts, and the 'discharge' on which they occur is supposed to represent about half the volume of the Nelson River. The White Mud Falls were considered to represent more than twice the quantity of water which passes over the Chaudière Fall at Ottawa. Should this estimate be correct, the whole body of Nelson River would be more than four times as great as the Ottawa at the above fall.

"Following the channel on the east side of Ross Island, the first break in the smooth water extending down from Lake Winnipeg is the Sea River Fall, at thirty-seven miles from the outlet. At twenty-one miles farther down we come to Pipestone Lake, which is on the same level as Cross Lake, and separated from it by an irregular strait five miles long. Between the level above Sea River Fall and that of Pipestone Lake, there are, in all, ten rapids, with a total fall of about thirty feet. Making an allowance of ten feet more for the current in the smooth portions of the river, there would be a difference

of about forty feet between the level of Lake Winnipeg and that of Pipestone and Cross Lakes. By the channel on the west side of Ross Island the navigation is uninterrupted from Lake Winnipeg all the way to Big Reed Lake, one part of which comes within four miles of the southern extremity of Cross Lake. Between Cross and Sipi-wesk Lakes ten more rapids occur, with a total fall of about eighty feet. This, with twenty feet for the current in the intervals between the rapids, would give a total descent of 100 feet from the one to the other. Below Sipi-wesk Lake no rapids, properly speaking, were met with as far as I went, but two others are reported to exist before Split Lake is reached. Above Sipi-wesk Lake the first rapid occurs at the Chain-of-Rocks, four miles up, and is very slight, having a fall of less than two feet. It could, no doubt, be easily passed by steamers. But the Red Rocks Rapids, at seven miles from the lake, are more serious, and would terminate the upward navigation of this section of the river. From these rapids downward, including Sipi-wesk Lake, there appears to be no insurmountable obstruction to the navigation of the river by steamers till the higher of the two rapids above Split Lake is reached, a distance of upwards of 100 miles.

"Sipi-wesk Lake and the first twelve miles of the river below it run nearly north-east, or with the general strike of the Laurentian gneiss and mica-schist on which they are situated; but at the above distance the river assumes a course bearing due north by compass (nearly north by east astronomically), or diagonally across the strike of the gneiss and the course of the glacial striæ, both of which have a general N.E. and S.W. bearing. The branches from the right, in this interval, run south-west, while those from the left flow north-east. The whole of the waters of the Nelson River appear to have come together in this stretch for the first time since leaving Great Play-

green Lake. The width now averages about a quarter of a mile, or rather more, with a depth of from forty to fifty feet. The current runs at the rate of about three miles an hour in the middle, except at two very narrow parts, where it is considerably greater. Owing apparently to the considerable depth of water across the greater part of the bed of the stream; strong eddies are found on both sides, which greatly facilitate the upward navigation of this part of the river. The general aspect of the country along the upper part of the Nelson River is even, or slightly undulating, the highest points seldom rising more than thirty or forty feet above the general level. Whiskey-Jack "Mountain," opposite the foot of Sea River Falls, is only from thirty to sixty feet high. The "High Rock," four miles above the entrance to the Echimamish, has an elevation of only about fifty feet. Such terms, applied by the inhabitants to mere banks and hummocks, indicate the general level nature of the country. On the north-west side of the inlet of Sipi-wesk Lake the hills rise to a height of from 100 to 150 feet, and appear to be composed of clay or drift materials. Along the north-west side of the lower part of this lake, the ground has an elevation of about 100 feet. Partridge Hill, seven or eight miles eastward of the outlet of the same lake, is the highest point observed in the district, and has an elevation of about 200 feet over the water.

"The solid rocks of the region are generally overspread with the prevailing gray clay, which, in some cases, is liable to bake and crack in the sun, but in others it forms a soft, mellow soil of excellent quality. Of course a good deal of fixed rock is exposed at the water's edge along the principal watercourses, but even in these situations the upper parts of the banks, including those of the smaller islands, are generally composed of clay.

"On either side of the channel west of Cross Island, the

country is rather barren. The shores are low, and consist mostly of points and knobs of gneiss with sandy bays, and bogs and marshes between them. Whiskey-Jack Portage, which connects the heads of two bays from opposite directions, passes along a strip of dry coarse sand, which looks as if it might have formed the north-western side of an ancient watercourse."

4. *Lake Winnipeg.*

Lake Winnipeg, lying between latitude 50° and 54° north, and long. 96° and 99° west, is 280 miles in length, and fifty-seven in its greatest breadth. Its southern extremity is 350 miles west-north-west from Fort William on Lake Superior. Its elevation above the sea is about 710 feet. From the mouth of the River Winnipeg, near its south end, to its northern extremity, it is the boundary between the generally rocky Laurentian country, and the Cambro-silurian limestone formation of the east side of the great central plain. It is very shallow at its southern extremity. Its shores are low and marshy at the entrance of Red River, and subject to inundations. By the report of Captain Munro, at low water the depth on the bar at the entrance of that river, in the shallowest part of the channel, is only four feet.

The navigation of Lake Winnipeg derives an additional importance from that of its tributaries, the Great and the Little Saskatchewan; the former being navigable for steamers, with but three interruptions, to Edmonton, on the North Branch, 772 miles, and probably farther, to the base of the Rocky Mountains; while the Little Saskatchewan and its lakes present a navigation of upwards of 300 miles from its mouth, or 500 from Fort Garry, without interruption.

Among the numerous tributaries received by Lake

MANITOBA THUNDER BAY TO WINNIPEG.

Winnipeg are,—Red River, draining in part a region which is in some degree tributary to the Mississippi. The English or Winnipeg River, 163 miles long, draining the region of the Lake of the Woods, and its tributaries 300 miles to the east. Numerous rivers come in from the eastern belt of the Laurentian rocks, which separates the valley of Lake Winnipeg from Hudson and James Bay. On the west side it receives the noble Saskatchewan, bearing its tribute from the Rocky Mountains, a thousand miles to the west. Red Deer River and Swan River fall into the Winnipegosis Lake, besides many other minor streams which drain the prairies to the west of those magnificent lake expansions. Lake Winnipeg drains a region 400,000 square miles in area.

5. *Lakes Manitoba and Winnipegosis.*

A little east of the middle of the tract of 240 miles in width, between Lake Winnipeg and the Assiniboine, and roughly parallel to them, extend Lake Winnipegosis on the north, and Lake Manitoba on the south; the latter receives the waters of the former by an elbow-shaped stream, and discharges its own into Lake Winnipeg from a bay on its east side, by a river called the Little Saskatchewan, which is fifty miles in direct length to its mouth.

These lakes are each 120 miles in length. The greatest breadth of Lake Manitoba is twenty-four, and of Lake Winnipegosis twenty-seven, miles. Taken together they extend 220 miles from north to south.

They enclose between them and Lake Winnipeg a peninsula of 250 miles in length by 100 miles in greatest breadth, which is cut across at the middle by the Little Saskatchewan.

This peninsula, though as large as the kingdom of

Denmark, counts for little in the north-west. Its interior is reported to be a low, flat country, abounding in lakes and marshes.

Round the south end of Lake Manitoba, for a circuit of about fifty miles, the soil is that of the richest description of prairie land. The few settlers consider it even superior to that of Red River. It is an undulating country of mingled woods and open prairie.

Between the upper end of Lake Manitoba and the Assiniboine are the Riding Mountains, and around Lake Dauphin there is much rich ground. Mr. Hind gives the Riding Mountains an elevation of 1000 feet above the land on the shore of Lake Manitoba; and Mr. Dawson estimates the Porcupine Mountains as rising about 1500 feet over the plain at their eastern base.

As the Little Saskatchewan, the outlet of Lake Manitoba, is a fine navigable stream of 750 feet in breadth, and the Waterhen River, which connects Lakes Manitoba and Winnipegosis, has a broad channel not less than three feet deep at low water, they present, together with these lakes, an unbroken line of water communication from Fort Garry to Mossy Portage, at the head of Lake Winnipegosis, a distance of about 500 miles.

6. *The Winnipeg River.*

Issuing from the Lake of the Woods through several gaps in the northern rim of the lake, the river Winnipeg flows through numerous tortuous and distinct channels for many miles of its course in a general north-east direction. Some of the channels unite with the main stream from ten to fifteen miles below Rat Portage, and one pursues nearly a straight course for a distance of sixty-five miles, and joins the Winnipeg below the Barrière Falls. The windings of this immense river are abrupt.

In its course of 163 miles it descends by a succession of magnificent cataracts 349 feet. Some of the falls and rapids present the wildest and most picturesque scenery, displaying every variety of tumultuous cascades, and foaming rapids with treacherous eddies, whitened with foam, and huge swelling waves rising massive and green over hidden rocks. The cascades and rapids of the Winnipeg are of great beauty, but neither sketch nor language can portray the astonishing variety they present under different aspects — in the gray dawn of morning, or rose-coloured by the setting sun, or flashing in the brightness of noon-day, or silvered by the soft light of the moon.

The river frequently expands into large deep lakes, full of islands bounded by precipitous cliffs or rounded hills of granite. The fort in the occupation of the Hudson Bay Company at Rat Portage is very prettily situated at one outlet of the Lake of the Woods. It is surrounded with hills about 200 feet high, and near the fort some white and red pine are standing amidst a vigorous second growth. The rock about Rat Portage is chloritic slate, which soon gives place to granite, so that no area capable of cultivation was seen until we arrived at Islington Mission.[1]

The Character of the Country about the Upper Winnipeg.

The broad river, with its numerous deep bays, stretches far to the north, and all around dome-shaped hills show their bare and scantily-wooded summits in every direction. Generally they seem to be thickly covered with small stunted pine, but in the hollows or valleys between them, pine and spruce of large dimensions, with fair-sized aspens and birch, flourish abundantly.

[1] Report by H. Y. Hind, M.A., Geologist and Naturalist to the Canadian Red River Exploring Expedition.

The aspect of the country is similar in its outline to the region about Mille Lacs, but the vegetation is not to be compared. At Islington Mission the general features of the country maintain an appearance of great sterility.

7. *The Red River.*

At its south end Lake Winnipeg receives the Red River, exceeding the Winnipeg River in length of course, but far inferior to it in magnitude. By its windings it is nearly 600 miles in length.

For the last 300 miles of its course its general direction is due north. It crosses the United States boundary about ninety miles west of the Lake of the Woods, a little over 100 miles from its mouth, and for that distance flows through the province of Manitoba in a nearly level prairie of the richest alluvial soil.

This prairie country is described as extending back, on the east side of the Red River, from four to about thirty miles, and on the west side about forty, to the ridge or hilly ground called the Pembina Mountains. Parts of it are marshy, as might be expected of an alluvial, nearly level plain, in a state of nature; but they are described as admitting of being drained with little trouble. The big swamp in rear of the Red River Settlement is twenty-seven feet above the surface of the river; and the nine mile swamp on Rat River, a small tributary on the east side above the settlement, is described as capable of being drained with comparatively trifling labour, and would form the richest of prairie land.

From its lowness (to which it owes its extraordinary fertility, like many other alluvial valleys) parts of it are sometimes, although very rarely, subject to inundations. About forty miles from its mouth the Red River receives its chief tributary, the Assiniboine. At their

confluence is situated the city of Winnipeg, containing 15,000 inhabitants, and being the commercial centre, as well as the seat of government, of the province of Manitoba. Here also is the old fort of the Hudson Bay Company, known as Upper Fort Garry.

The Red River is 480 feet wide and twelve feet deep at the middle settlement. It is navigable to the United States boundary, and far to the south of it by boats of light draft; but the navigation is subject to interruption from drought in dry seasons.

From Winnipeg to the United States boundary, about fifty-seven miles, its banks are fringed with wood, from a few yards to half-a-mile in breadth, and the peninsulas it forms are well wooded. The woods of elm, poplar, oak, and ash towards its mouth have heretofore supplied the wants of the settlers.

The alluvial clay of the Red River and the Assiniboine is well fitted for the manufacture of excellent white bricks and common pottery.

With reference to the physical features of the Red River, Hind says it is merely necessary to imagine a river from 200 to 350 feet broad, with a moderately rapid current, having in the course of ages excavated a winding trench or cut, to the depth of from thirty to forty feet, in tenacious clay, through a nearly level country, for a distance exceeding 100 miles; and the general physical aspect of the Red River, within British territory, is reproduced. Here and there local diversities occur, which give some appearance of variety—Grand Rapids, where the even flow is broken and disturbed by a ledge of limestone, which may occasion a fall of four feet within a mile. A lower plateau has here and there been excavated, perhaps ten feet below the general level of the prairie banks. Occasionally sand, mud, and gravel bars are formed at numerous sharp turns in the general course

of the stream, similar to those which may be observed upon the chart at Point Douglas, also above Fort Garry, near la Rivière Sal, as well as near Scratching Creek, etc. These projecting bars or points are often covered with fragments of limestone, boulders of primitive rocks, and vast numbers of large fresh-water shells. The current round them is rapid, and they present a formidable obstacle to the steamers, exceeding 100 to 120 feet in length, which are used in the navigation of the river. Often, too, on one side or the other, and sometimes on both sides, a narrow belt of heavy forest timber closes upon the river, and seems suddenly to narrow and darken its abrupt windings. The most uniform character, however, and one which is more frequently found on the west side, is a clear and steep line of bank, about thirty feet in altitude, perfectly level to the eye, and forming the boundary of a vast ocean of prairie, whose horizon or intermediate surface is rarely broken by small islands of poplar or willow, and whose long, rank, and luxuriant grasses show everywhere a uniform distribution, and indicate the character of the soil they cover so profusely. A subsequent closer inspection never fails to establish the fertility of the soil, as well as its extent, over areas as far as the eye can reach, both eastward and westward, on the banks of this remarkable river.

8. *The Lake of the Woods.*

The Lake of the Woods is over seventy miles in extreme length, and from its exceedingly irregular form has a very extended coast-line. It belongs to that system of inland waters which includes the Great Lakes to the east, and is continued in the north and west by Lakes Winnipeg, Athabasca, Great Slave, and Great Bear Lakes, all of which lie along the southern and western

margin of the great metamorphic nucleus of the continent, where its crystalline rocks sink below those of Silurian and Devonian age. This lake, in its geographical and geological relations, thus differs from those which cover so great a part of the surface of the crystalline metamorphic series itself, and which appear to occupy shallow rock basins in it.

The water supply of the lake is derived chiefly from the northward and eastward, by the Rainy River, a magnificent stream, draining the western slope from the water-parting which divides the waters flowing to the Lake of the Woods from those falling eastward into Lake Superior. The tributary streams from the country lying west of the lake, though comparatively numerous, are unimportant, as the low ridge which separates these from the others passing westward into the Red River lies very near the lake. The lake discharges its waters by the Winnipeg River at Rat Portage, and there begins a descent of about 300 feet to Winnipeg Lake by a fine cascade and rapid.

The northern part of the lake is studded with innumerable islands, comparatively few of which are marked on any map. Some are several miles in length—others of very small size; but they are invariably composed of solid rock, and seldom have more than a very scanty covering of soil. The shores of this part of the lake are also rocky and bold, and the water clear and deep, giving rise to its common name of Clearwater Lake. It communicates by several narrow passages through a maze of islands with the southern portion, which is totally different in character. Here islands are comparatively rare, and the lake forms a broad sea-like expanse, which is easily thrown into violent agitation by the winds, rendering canoe navigation somewhat precarious. The shores are for the most part low and swampy, in some places covered with a dense growth of tamarack (*Larix*

Americana), but often bordered by low sand-hills, and stretching out behind them in great reedy *Muskeys* (a Chippewa word generally adopted to designate the wide, grassy swamps of this region). The water is comparatively shallow and somewhat turbid. To this part of the lake the name Lake of the Woods is generally applied, but it is more properly called Lake of the Sand-hills. A third great division of this system of waters lies between the eastern bays of Clearwater Lake and Lake of the Sand-hills. It communicates with the former by narrow channels, and from the latter is entered across a rocky division known as Turtle Portage. This part of the lake is designated White-fish Lake, and has never so far been properly examined or surveyed. Lac Plat, situated to the west of Clearwater Lake, may, though much smaller than the others, be counted a fourth division. The north-west angle inlet is a narrow arm running westward from near the junction of Sand-hill and Clearwater Lakes. On it is situated the eastern terminus of the road from Winnipeg, and in connection with this there is a Government Station for immigrants. There is also a post of the Hudson Bay Company, several traders' houses, and usually a large camp of Indians. At Rainy River is another Government post known as Hungry Hall, and between this place and the north-west angle a steamer formerly plied regularly, forming a link in the water route from Lake Superior to Manitoba. The mouth of Rainy River is also, and has been from time immemorial, a favourite camping-place of the natives. At Rat Portage there is a small Hudson Bay trading post.

9. *The Beaver or Churchill River.*

The Beaver River has its source about forty miles from North Saskatchewan at Fort Edmonton. Its course

to Hudson Bay is about 1100 miles in length. For 250 miles from its source, its course is in the plain country of Silurian or more recent formations. It then, below Isle à la Crosse, enters the great primary or azoic belt, which covers the remainder of its course within this section. It may be considered as draining part of the same plain as the Saskatchewan, their basins being divided only by rocks a few feet in height. At Frog Portage, 230 miles lower, crossing to a tributary of the Saskatchewan, the waters of the Beaver flow over into it at high flood.

Sir John Richardson says that the Churchill River drains a comparatively small extent of prairie land, and Captain Palliser describes the country between it and the forks of the Saskatchewan as a thick wood country, with many lakes abounding in fish.

Sir Alexander M'Kenzie, who speaks favourably of the soil on the upper part of the Beaver River, describes the buffaloes ranging over the patches of prairie along it, and mentions a garden at Isle à la Crosse that well repaid the labour bestowed on it. He speaks of Lake à la Crosse abounding in "the finest fish in the world," and of the richness of its surrounding banks and forests in moose and fallow deer, with the vast number of the smaller tribes of animals, and the numerous flocks of wild-fowl.

As its Indian name Mississippi, "Much Water," implies, the Beaver or Churchill, as it is called in its lower course, is a river of great volume. At Island Portage, above Frog Portage, Sir J. Richardson speaks of its being 500 or 600 yards wide, with a strong current where pent up and narrow. Eastward of Lake à la Crosse, where it passes through the primary or azoic formation, the soil of the country is poor, sandy, stony, and rocky. Describing part of it, Sir J. Richardson says the general aspect of it is like the country on the north shores of Lake Superior, though the water basin is not so deeply excavated.

CHAPTER V.

THE BASIN OF THE MACKENZIE RIVER AND ITS TRIBUTARIES.

1. *General View.*

THE Mackenzie is the largest river in the western hemisphere which contributes its waters to the Arctic Ocean. It was discovered by Sir Alexander Mackenzie in 1789, and followed by him to the sea in 1793. Of this journey he gives an interesting account (Mackenzie's *Voyages*, Philadelphia, 1802). This great river, including its main tributary the Peace, has a length of not less than 2500 miles; and of this not less than 2000 miles are navigable for steamboats, with a few short interruptions caused by falls and rapids, all of which could be easily surmounted by locks. The area drained by the Mackenzie and its tributaries is about 550,000 square miles, or almost double that of the St. Lawrence basin. It receives the waters of the eastern slopes of the Rocky Mountains through fifteen degrees of latitude, and that of the western slopes from M'Leod Lake and the head of the Parsnip in latitude 54° 20′, to the arctic circle. The rivers by which this enormous volume of water finds its way to the Mackenzie are, from south to north, the Athabasca, the Peace, the Liard, and the Peel. Its principal eastern drainage, coming from the land of the musk-ox and the reindeer—The Barren Grounds—is received through the three great lakes, Athabasca, Great Slave, and Great Bear. Between Lakes

Athabasca and Great Slave Lake the river is known as Stony River and Slave River.

The Barren Grounds may be defined as extending from the water-parting immediately north of Churchill River to the Mackenzie, along the slopes towards Hudson Bay and the Arctic Ocean. This extremely desolate and inhospitable region is occupied by a portion of the great Chipewyan or Tinneh tribe, who regard it as the cradle of their race, whence they claim to have spread in other directions.

Stunted shrubs of the hardiest kinds—dwarf birch, willows, and the like—scantily clothe the more favoured spots along the watercourses; while elsewhere various lichens, the peculiar food of the reindeer, interspersed with stones and stagnant water-pools, alone characterise the dreary scene. Yet amid these unattractive wilds the natives obtain an abundant, if at times precarious, subsistence by fishing and the chase. Reindeer (of the smaller variety) are extremely numerous during the period of their northern migration, commencing in March; and the musk-ox (*Ovibos moschatus*) finds in these solitudes a congenial and perennial field. On the immediate sea-frontier the polar bear appears; but no other of the larger quadrupeds than those enumerated is found. The beaver, common to nearly every portion of North America, shuns a scene where all its industry would fail to procure it a living; and it is not till the hunters reach the line of about the 65th parallel that they are able to procure the fur of this animal for the purposes of barter. The ptarmigan is found in abundance, as also the white fox; with wolves, some of which are white, and in parts the arctic hare (*Lepus variabilis*). Most of the lakes are well stocked with white-fish and other kinds; and probably salmon of some of the numerous varieties ascend all the larger rivers between the Churchill and the Mackenzie, in neither of

which do they appear. A variety called the "Copper Mine River Salmon" (*Salmo Hearnii* of Richardson) is known to ascend the river of that name; and the native name of the Back River—*Thleu-e-chodezeth* (or tesse)—lead some to infer that that also is frequented either by this or some other variety. *Thleu-e-cho*, literally "big-fish," employed by the *Tâh-cully* of the Upper Fraser to designate the sturgeon, is on the Mackenzie applied to the salmon of the Yukon. Reindeer are the only species of the family found on the Lower Mackenzie; foxes of several varieties, including the white (*Vulpes lagopus*), occur; also the marmot, the bear, etc. In addition to the many kinds of migratory water-fowl that resort to these localities to breed, the white grouse or ptarmigan (*Lagopus albus*) appears abundantly as a permanent resident, as indeed along the whole of the arctic watershed and the shores of Hudson Bay. The white-fish (*Coregonus*), several varieties of carp, trout, and other fish, including the inconnu (probably grayling, *Thymallus signifer*, of Richardson?), are common to the stream and its tributaries. The pike also is found, but no salmon ascend this river, which in this respect forms probably the solitary exception among all the larger streams from California upwards to this point. For the deficiency of this valuable fish there is no apparent cause; nor does there seem to exist any reason why it should not be artificially introduced at some future day. Higher up, as we approach the discharge of the Great Bear Lake, the evidences of an improving climate appear. The service-berry (*Amelanchier*), the wild gooseberry, and other fruits, are common; the country throughout is well timbered, chiefly with varieties of fir and pine; and a greater variety of beasts of the chase, including the moose, the beaver, etc., appears. Of the minerals in this quarter little can be said; but from the name of the rivers before mentioned, and from reports,

we may be justified in believing that rich deposits of copper, at least, exist. The Esquimaux occupy the whole seaboard.

Mackenzie describes the mouth of the river, latitude 68°, as having innumerable islands, its depth to be from 4 to 50 fathoms, and its breadth from half a mile to two miles, with a current of six miles an hour, and a volume double that of the Niagara or Missouri Rivers.

The islands are covered with trees of a small growth, and in places spruce and fir of a larger size; the banks where high are wooded, partly with birch and fir; berries are abundant, and the ground in places is covered with short grass and flowers. This was on the 12th July, in latitude 68° north, nearly 2000 miles beyond the Lake of the Woods in a direct north-westward direction, and 3000 miles from Montreal, or as far as that city is from the mouth of the Orinoco in South America. This comparison is made to give an idea of the extent of the country here described. Mackenzie accomplished the distance from Fort Chipewyan to the mouth of the river and back, a boat voyage of 3000 miles, between the 3d of June and the 12th of September, or in 100 days, thus showing that during this season at least the navigation is open. The whale fisheries in Bering Strait, to which the Mackenzie River affords a short route and easy access, are the richest known, and are extensively resorted to by American whalers, who, to reach this fishing-ground, sail 16,000 miles.

The Athabasca is the most southerly extending tributary of the Mackenzie, and little if at all inferior to the Peace, either in length or in the volume of water which it carries. It rises on the eastern slopes of the Rocky Mountains, in the Leather or Yellowhead and in the Athabasca passes. The Athabasca Pass, latitude 52° 20′, is 6025 feet above the sea. It crosses between

Mount Hooker and Mount Brown, two of the highest peaks of the Rocky Mountains, and leads directly to the Boat Encampment on the great south bend of the Columbia River. The Leather Pass, 3746 feet above the sea, strikes the easternmost sources of the Fraser River. From these passes the Whirlpool and the Miette Rivers issue, and the latter has a length of 18 miles and a fall of 352 feet to its junction near Henry House with the Whirlpool Athabasca, 55 or 60 miles from the summit of the Athabasca Pass. Thence the Athabasca or Elk River takes a general north-easterly course, and, passing Jasper House, which stands in a wide and beautiful valley within the mountain, it flows with many sweeping curves and sharp bends to Fort Assiniboine, 360 miles from its source in the mountains. Its largest tributary in this part of its course is the M'Leod River, which takes its water from the water-parting between the Athabasca and the Saskatchewan, and joins the former about 50 miles above Fort Assiniboine. Here the Elk or Athabasca is described as a stream 300 yards in width, flowing in a valley from 1 to 2 miles wide, and 250 feet below the level of the surrounding plain. At about 40 miles lower it receives on the south the Pembina, which, like the M'Leod, gathers its water from the water-parting between the great valleys of the Saskatchewan and the Athabasca, and has a course of about 250 miles. Thirty miles below the confluence of the Pembina, the Lesser Slave River comes in from the north-west, with a course of 40 miles to its head in Lesser Slave Lake. This lake extends nearly east and west 100 miles, with an average breadth of 20 to 30 miles. From this the river makes an elbow south-eastwards and then turns nearly north, which general direction it maintains to its discharge in Lake Athabasca, receiving midway, at 150 miles from its mouth, Clearwater River, coming from Methy Portage on the south-east.

The Portage à la Loche, or Methy Portage (Methy = Loche = Freshwater Cod = *Gadus barbatula*), is on the dividing ridge between the waters flowing to Hudson Bay by the valley of the Mississippi, and those tributary to the Mackenzie through the Athabasca. The summit of this portage, which is elevated very considerably above the general level, has an altitude above the sea, as given by Dr. Richardson, of 1566 feet; but this estimate is probably somewhat underrated. The length of the portage is 13 miles, over a level sandy plateau, stony in parts, and wooded with Banksian pine, spruce, and other trees. The northern side is a steep escarpment, descending by eight successive stages, all more or less precipitous, to the borders of the Clearwater, which flows by a course of some 80 miles, through a charming valley of mingled plain and forest, to the Athabasca.

It is by this route, and the Portage de la Traite on the opposite side of the Mississippi Valley, that the transport is effected between Athabasca and Lake Winnipeg *viâ* the Saskatchewan. This last portage has its name from the circumstance that Frobisher, the pioneer trader from Canada, here intercepted a large party of Indians on their way to Churchill in 1774, and secured their hunts. By the Crees this portage, from an old tradition, is called *Athikesipichégan* Portage, *i.e.* Portage of the Stretched Frog-skin. Hence the name applied to it in some recent maps, "Frog Portage," but it is better known by the name given above. The view down the valley of Clearwater River from Methy Portage is thus described by Sir Alexander Mackenzie:—"From thence the eye looks down on the course of the little river, by some called the Swan River, and by others the Clearwater and Pelican River, beautifully meandering for thirty miles. The valley, which is at once refreshed and adorned by it, is about three miles in breadth, and is confined by two lofty

ridges of equal height, displaying a most delightful intermixture of wood and lawn, and stretching on till the blue mists obscure the prospect; some parts of the inclining heights are clothed with stately forests relieved by promontories of the finest verdure, where the elk and buffalo find pasture." The scenery and the vegetation remain, but the elk and the buffalo have passed away, to be replaced, however, at no distant date, by vast herds of domestic cattle, for the rearing of which the magnificent pastures of this region are eminently adapted.

Sir John Richardson describes the scenery as unequalled, the soil as sandy, but on a limestone basis, which is favourable to its warmth as well as to its fertility. The whole length of the Athabasca is 900 to 1000 miles. Approaching Lake Athabasca, the high banks of the river valley sink into the alluvial plain at its mouth, and which is thus described by Professor Macoun in the Report of the Geological Survey of Canada for 1875-76, page 91:—"The whole country around the south and west sides of Lake Athabasca is a vast alluvial plain, elevated but a very few feet above the level of the lake, and some years much of it is flooded. The first night after leaving Fort Chipewyan we slept in the boats owing to the lowness of the land, not more than one foot above the water. The Athabasca has formed a large delta at its mouth, and is every year silting up the lake with the mud it brings down. For miles before we entered it we passed over mud flats due to the same cause. The mouth, or mouths, of the river are formed by a series of willow swamps and islands scarcely a foot above the water. Where we breakfasted the land was two feet above the water, at dinner four feet, and where we slept six feet. This was twenty-five miles from the lake, and the first spruce was seen, showing that here the land was never permanently flooded. One day and a half

from the lake we reached the Embarras River, where the delta commences. Here the general level is about ten feet above the water. The whole of the country between this and the lake is alluvium, brought down by the river in bygone ages. All this immense delta, including Lakes Claire and Mamawa and their bordering marshes, and all that part of the Peace River Valley below Peace Point, may be called the delta of the Peace and Athabasca rivers. The water of the Athabasca is even muddier than that of the Peace, but that of the Slave River issuing from the lake is quite clear."

In many places along the banks of the Athabasca, Clearwater, and Slave rivers there are copious springs of salt and petroleum, and there is no doubt that this region will some day vie with Pennsylvania and Ontario in the production of these valuable materials.

In returning up the river Sir Alexander Mackenzie describes the air, for some portion of the way, as laden with a smell of sulphur, caused by the burning of lignite on the river bank. This was, however, probably a mistake, as, although there are many and valuable beds of lignite coal in the region, and some of them are on fire, their combustion does not give rise to deposits of sulphur or to sulphurous odours. These are caused by the spontaneous and more or less local combustion of the pyritous shales of Mesozoic age, which form cliffs along the upper tributaries of the Mackenzie, and this curious combustion is well exhibited on "Smoky River," one of the localities alluded to by Mackenzie. It is fully described in the Reports of the Geological Survey of Canada, 1875-76 and 1879-80.

Lake Athabasca, or the Lake of the Hills, 180 miles south-west of Slave Lake and 620 feet above the sea, is an elongated body of water nearly 200 miles in length, and 14 to 15 miles average width. Stone River, issuing

out of Lake Woolaston—a circular lake 45 miles in diameter, lying west-south-west of Athabasca—passes through several small lakes, between which it is sometimes called Porcupine River, and ultimately falls into the Lake of the Hills. About 50 miles east of Stone River another large river issues from Lake Woolaston, and after a northerly course of 100 miles, bends sharply to the south and flows into Reindeer Lake, the waters of which empty by the Churchill River into Hudson Bay. Lake Woolaston is thus one of the main sources of the Mackenzie and also of the Churchill.

Stony River, the principal outlet of Athabasca Lake, at its north-western extremity flows between marshy banks, and at the distance of 30 miles mingles its waters with Peace River; the combined streams form Slave River, which varies in width from three quarters of a mile to one mile and three quarters, and is 300 miles in length. About 60 miles below its head its navigation is interrupted by a series of rapids, occasioning a succession of portages between Dog River and the rapids of the Drowned, after which the river is uninterruptedly navigable to Slave Lake. Issuing from Great Slave Lake at the western end, the river bears the name of Mackenzie, its discoverer, and continues its course to the Arctic Sea, receiving on its way the Liard from the west, with a course of 750 to 1000 miles, as well as the Du Rocher and the waters of Great Bear Lake from the east.

2. *The Peace River.*

The Ungigah or Peace River, the largest branch of the Mackenzie, is formed by the confluence of the Parsnip, the Nation, and the Finlay, which rise on the west side of the main axis of the Rocky Mountains between the 54th and 57th parallels, and the 120th and 127th

meridians, and drain a large section of the great high plains of British Columbia lying between the Cascade Range and the Rocky Mountains. Traversing the mountain axis in a profound gorge, these united waters, after a course of 1000 miles east by north through a magnificent country, and having received a number of smaller rivers, the largest of which are the Pine, the Smoky, and the Vermilion, empty into Slave River, as already stated, about 30 miles north of Lake Athabasca. At high water in the spring, a great part of the water of Peace River passes by the Quatre Fourches River into Athabasca Lake; while later in the season the current is reversed, and a part of the drainage of the lake passes by the same channel into Peace River.

It would require too much space in this work to give full details of the boundless resources, varied character, and wonderful fertility of the valley of the Peace River, and we must for these refer the reader to the reports already cited of the Geological Survey of Canada for 1875-76, 1879-80, and 1880-81. Accompanying the latter is a map of this vast region, from the Pacific Ocean to Fort Edmonton on the Saskatchewan.

3. *The Du Liard River, or River of the Mountains.*

This large tributary of the Mackenzie is formed of two branches, rising west of the Rocky Mountains in Lakes Dease and Simpson, situated in long. 130° west, and 200 miles apart. Receiving numerous tributaries, and flowing on independent courses for about 150 miles, these branches unite a little south of the 60° of latitude. Thence the river continues in a south-easterly course for about 250 miles, in which distance it passes, like Peace River, in a deep cañon across the main axis of the Rocky Mountains. At about 50 miles west of the mountains

it turns due north, and continues this course for nearly 200 miles, until it enters the Mackenzie at Fort Simpson, 400 feet above the sea. Fort Liard is situated on it a little south of the 60th parallel. Speaking of this place Richardson says: "Though this part is more elevated than Fort Simpson by at least 150 feet, and is only two degrees of latitude to the southward, its climate is said to be very superior, and its vegetable productions of better growth and quality. Barley and oats yield good crops, and in favourable seasons wheat ripens well. This locality, then, he adds, on the 60° parallel may be considered as the northern limit of the economical culture of wheat. Such being the climate at that latitude on the Du Liard River, it may reasonably be assumed to be fully as favourable in the country extending 200 miles farther south on its eastern branch and on Hay River."

4. *The Hay River.*

Hay River, a tributary of Slave Lake, is nearly 400 miles in length. It has two branches,—the west one rises in Hay Lake, the other rises not far from the banks of Peace River, and flows at no great distance from Fort Vermilion. The country on this branch is described by Sir John Richardson as an agreeable mixture of prairie and woodland, and frequented by vast bands of buffaloes. This, he says, is the limit of those vast prairies which extend from New Mexico. Below the forks of Hay River, the country on it is covered with forests, and intersected with swamps. Here, as elsewhere in all the region drained by the Mackenzie, the buffalo is extinct, being now rarely if ever seen north of the Saskatchewan.

BRITISH
COLUMBIA
VANCOUVER
ISLAND
M O N T A N A

CHAPTER VI.

THE WESTERN SLOPES OF THE ROCKY MOUNTAINS AND THE RIVERS AND LAKES OF BRITISH COLUMBIA.

1. *General View.*

BRITISH COLUMBIA—bounded on the south by the U.S. territories of Washington, Idaho, and Montana, on the east by the Rocky Mountains, and on the north by the 60th parallel of latitude—is eminently a land of mountains, lakes, and rivers. It may be fitly designated the Alpine Province of the Dominion.

It has an average length from north to south of 800 miles, and a breadth from east to west of about 300 miles. Except the north-eastern section, drained by the Liard and the Peace, affluents of the Mackenzie, its waters are carried to the Pacific Ocean by the Columbia, the Fraser, the Skeena, Babine or Simpson, and the Stickeen; while a number of smaller streams empty into the heads of the numerous deep fiords which indent the coast from New Westminster to Nasse Harbour on the confines of Alaska.

Dr. G. M. Dawson says:[1] "Three main structure directions serve to account for the greater part of the depressions of the surface now occupied by the rivers, lakes, and fiords of British Columbia—1. A north-westerly and south-easterly series, dependent on the general folding of the rocks; 2. A north and south series, due to systems

[1] *Quarterly Journal Geol. Soc.*, No. 133, Feb. 1879.

of parallel breaks; and 3. An east and west series, the cause of which has not yet been determined.

"The arrangement of the lakes and their long river-like forms are very remarkable, suggesting, at least, the action of glacier ice, which, though it may possibly have formed rock basins in some places, has generally been instrumental in causing lakes by the arrangement of drift material in pre-existing hollows."

The only important western tributaries of the Columbia rising to the north of the 49th parallel are the Okanagan and its large feeder, Similkameen. The former discharges the lake of the same name, and the latter rises in the high mountains west of Hope on the Fraser River. Okanagan Lake is about 60 miles in length, and only 3 to 4 miles wide. The distance from the head of the lake to the confluence with the Columbia in lat. 48° north is nearly 200 miles.

2. *The Columbia River.*

The Columbia is the largest river of America flowing to the Pacific Ocean. It drains an area of 298,000 square miles, and its length is estimated at 1400 miles, nearly half of which is through British territory. It rises 3090 feet above the sea, in the Upper and Lower Columbia Lakes, near lat. 50°, long. 116 W., at the base of the Rocky Mountains. From its source it flows north-westerly in a deep and narrow valley, parallel with the mountains for nearly 200 miles, to the Boat Encampment at the entrance to the Athabasca Pass. Here it receives its northernmost tributary, Canoe River, coming from the north-west, and whose valley, together with those of the Columbia, the Kootanie, and the Fraser, from Tête Jaune Cache downward, forms an uninterrupted and nearly straight north-west and south-east depression 450 miles

in length, from the 49th to the 54th parallel of latitude. This great but narrow valley, bounded on both sides almost throughout its length by snow-clad peaks, is one of the most remarkable features of British Columbia. Standing in the centre of the valley at Cranberry Lake, it is difficult to realise the fact that you are on a divide, so gradual is the fall north-westward to the Fraser, and south-eastward down Canoe River to the Columbia. Canoe River is here, between 50 and 60 miles from its mouth, 2622 feet above the sea; and Tête Jaune Cache on the Fraser, 13 miles distant, 2400 feet. From the Boat Encampment at the Big Bend, the Columbia turns south-west and south for 200 miles, to the United States boundary at Fort Shepherd. In all this distance it receives only one large tributary—the Kootanie. Its chief sources are considerably to the northward of those of the Columbia. It flows southward into Montana, and receives the drainage of the west slope of the Rocky Mountains from its sources in the Vermilion and Kicking Horse passes, nearly to the 49th parallel. Making a great, almost semicircular, sweep through Montana, it re-enters British Columbia, and passing through the southern end of the great Kootanie or Flat Bow Lake, it issues on its western side with the added drainage of the lake, and falls into the Columbia 40 miles to the westward, a short distance below the Lower Arrow Lake. Its length is estimated at 450 miles. Opposite Fort Shepherd, on the 49th parallel, is the mouth of Clarke's Fork, Pend d'Oreille or Bitter Root River, the second largest affluent of the Columbia. The sources of its northernmost tributary, the Flathead River, issue from the Kootanie and Boundary passes of the Rocky Mountains between the 114th and 115th meridians, north of the 49th parallel. In Montana the Flathead River expands into a lake of the same name, 30 miles long and 12 or 14 miles broad,

crossed about its centre by the 48th parallel of latitude; continuing its southerly course for 30 miles, it falls into the Clarke; and the united waters then take a north-westerly course to their confluence with the Columbia at Fort Shepherd. In Idaho, between the 116th and 117th meridians, latitude 48° 10′ north, the river again expands into a lake called Pend d'Oreille, 30 miles long, 8 miles broad, and 1600 feet above the sea. Gold has been found in the sands on nearly all the tributaries of the Columbia, both in British Columbia, Montana, and Idaho.

Crossing the 49th parallel at Fort Shepherd, the Columbia flows southward to the 48th parallel, then westward to the confluence of the Okanagan River, then south-west, south, and south-east for 160 miles, to the mouth of the Snake or Lewis River, its largest tributary. A few miles below this junction it strikes the northern boundary of Oregon, and abruptly changes its course towards the west, forming the boundary between Oregon and Washington territories for 250 miles to its mouth in the Pacific Ocean. The navigation of the Columbia is divided into four sections, a part of the upper section only being in British territory. The first is from its mouth to the Cascades, 160 miles, only a little above the head of tide water. Vessels of the largest size that cross the bar at its mouth can ascend to Vancouver, 115 miles. The obstruction to navigation at the Cascades makes a portage of 6 miles necessary. This is now made by means of a railroad. The second section is from this to the Dalles, a distance of 50 miles. Here another railroad, 14 miles long, has been laid to Celito. Thence the third navigable section reaches to Priests Rapids, 185 miles; and the fourth section extends from Fort Colville, where the river is 700 yards broad, and 1050 feet above the sea upwards for 250 miles, passing through the Upper and Lower Arrow Lakes, 85 to 90 miles in length, nearly to

the Boat Encampment at the Big Bend. Above this the river is only navigable for small boats, with numerous interruptions from falls and rapids.

3. *The Fraser River.*

This river drains about 100,000 square miles, a much larger area within the province than the Columbia. It receives nearly all the water of the eastern slope of the Cascade Range from the 49th to the 53d parallel, also the greater part of that of the central plateau, and of the western slope of the Gold Range; while its eastern sources are in the Rocky Mountains between the 53d and the 55th parallels of latitude. Its main eastern branch issues from the mountains on either side of the Leather Pass, latitude 52° 55′, longitude 118° 30′ west. From the summit of the pass above Yellow Head Lake, 3746 feet above the sea, following the course of the stream to its mouth in the Strait of Georgia, is a distance of not less than 650 miles. Its main western branch, the Nechaco, takes its rise in François Lake, or Lac des Français, only a few miles less distant from the mouth, and one degree north of its eastern source in the Leather Pass. This branch also carries to the Fraser the water of the Stuart River and its long chain of lakes, the northernmost of which, Lake Tacla, extends nearly to the 56th parallel of latitude, and lies in a long narrow depression which separates the tributaries of the Skeena on the west from those of Peace River on the east, the intervening distance being not more than 30 miles. The Nechaco joins the Fraser at Fort George, a trading post of the Hudson Bay Company, latitude 54°, and 1908 feet above the sea. Below this there are only two other tributaries from the west of any importance—the Black or Westroad River and the Chilcotin, respectively 40

and 150 miles below Fort George. The former is of interest as having been the route by which Sir Alexander Mackenzie reached the Pacific on his memorable journey from Athabasca Lake, *viâ* Peace and Fraser Rivers, in 1793, when he supposed the Fraser to be the Columbia. Except a number of small streams, the only tributaries of the Fraser from the east are—the Quesnelle, at the mouth of which is situated the rising town of the same name, and the point where the road for the Cariboo goldfields leaves the valley of the Fraser; and at Lytton, 200 miles lower down, the Thompson, which issues from the west end of Kamloops Lake, bearing the united waters of the North and South Branches. The North Thompson rises in Albreda Lake, within 25 miles of the bend of the Fraser at Tête Jaune Cache, but its water is chiefly derived from the glaciers and snowfields of the northern spurs of the Selkirk and Gold Ranges. It flows south-

VALLEY OF THE THOMPSON.

easterly, while the Fraser takes a directly opposite course, and after flowing 450 miles, the two rivers unite, as before stated, at Lytton, having circumscribed an oval space about 300 miles in diameter from north to south, and 120 miles from east to west. This space includes the Cariboo Mountains, and the whole of it has a high elevation, indented with numerous deep valleys and lake basins. The South Thompson rises on the western slopes of the Gold Range near the Boat Encampment and the Upper Arrow Lakes of the Columbia, and it carries the overflow of the Great and Little Shushwap Lakes, which, together with Kamloops Lake and the connecting river, afford uninterrupted navigation by steamboats for nearly 100 miles, for the most part through a fine agricultural and pastoral country.

From Lytton to Hope, 60 miles, it receives no tributaries, but below Hope the Fraser receives two large tributaries from the north—Pitt River, about 25 miles from its mouth, and Harrison River, some 35 miles farther, each being the outlet of a large lake. Pitt Lake is about 12 miles in length; Harrison about 30 or 35. They both fill deep gorges in the mountains, which rise abruptly from their banks, and in many respects bear a strong resemblance to the *fiords* of the coast. Harrison Lake is fed by the Lilloet River, which, about 30 miles up, expands into a lake of the same name, 20 miles in length, fed by the Chatham, the Upper Lilloet, and the Birkenhead Rivers, the latter leading to the Pemberton portage, which connects, by Lakes Anderson and Seton, with the Fraser River 100 miles above Hope. Steamers can ascend from Fraser River to the head of Harrison Lake. At the lower end of the lake, near the outlet, a hot spring bubbles up among the rocks, close to the water's edge, emitting a very perceptible odour of sulphur, and having its peculiar taste. The water of the spring has

never been analysed. It will doubtless be found to possess valuable medicinal properties.

Anderson and Seton Lakes, lying nearly at right angles to Lilloet and Harrison Lakes, cut through the Lilloet range of the Cascade Mountains. The former is about 14 miles long, bearing north-east. Between the two lakes there is a portage road about 2 miles in length, along a river 100 feet wide, which flows with great force, the difference of the level of the lakes being about 60 feet. Seton Lake is about 16 miles long, of a serpentine form. Looking down from the head of it, a magnificent picture of mountain scenery is presented. The lake is only 800 feet above the sea, and the surrounding mountains rise abruptly 3000 to 5000 feet. A mile from the foot of Seton Lake the Cayoush River joins that issuing from the lake, and 2 miles farther the united streams flow into the Fraser a little below the town of Lilloet. This chain of lakes and portages constitutes the well-known Douglas route, 100 miles in length, by which the interior of the country was reached before the waggon road was made in 1863 from Yale up the Fraser, Bonaparte, and Thompson valleys to Clinton. It was adopted to avoid the then impassable cañons of the Lower Fraser, but it is now only used by Indians, and the road is overgrown with grass and brush; while the mountain sides in the neighbouring valley of the Fraser are already echoing the shrill whistle of the locomotive as it rushes along on the iron road which at no distant date will connect this remote Alpine Province of the Dominion with her elder and more populous sister provinces in the east. The gorge of the Fraser River through the coast range, though perhaps inferior to that of the Columbia, is a scene of rugged and picturesque grandeur. The forms of many of the summits are singular in the extreme. The forests which hang on either side are broken by rocky cliffs and

precipices and tiny waterfalls, and the river itself, compressed within narrow walls, rushes through as if impatient for the liberty of the ocean. This gorge may be said to extend from Lytton to Hope, but the river is navigable for steamers from its mouth up to Yale, 90 miles; thence to Lytton it is not even navigable for canoes. Yale is 13 miles above Hope. Between Hope and New Westminster the river spreads out into numerous channels, some of them dry at low water, having extensive "bars" of sand and gravel, and low islands between them. It is often, in fact, 2 or 3 miles between the extreme banks. The influence of the tides is felt as far as the Sumass, 55 miles up, where the first rapid occurs. Its entrance into the Gulf of Georgia is marked, as might be expected, by shoals, the deposit of its freshets. An extensive tract of alluvial land, for the most part wet, and, till reclaimed by dykes, unfit for cultivation, lies between its mouths, and on the south reaches to Siniahmoo Bay. The immediate banks of the river are chiefly alluvial for a distance of 50 or 60 miles, and are overflowed in the summer. They are covered with cotton-wood (poplar) and a thick growth of willows. Back from the water are a few small prairies, of which the largest are around Langley, and on the Sumass and Chilukweyuk. The low lands much resemble those on the Lower Columbia. The prairies are rich, having about a foot of black mould, with a subsoil of clay and sand. It is here, between Burrard Inlet and the Noot Sahk, and extending from a little above the Chilukweyuk to the mouth of the Fraser River, that the most extensive tract of level country in British Columbia is to be found. There is a remarkable parallelism in the general course of the two great rivers of British Columbia. From their sources they both flow in a nearly northwesterly direction for about 180 miles; they then both make a sharp turn, generally known as "The Big Bend,"

to the south, flowing almost due south, and nearly parallel with each other for 350 miles—the Fraser to Hope and the Columbia to Colville, whence they each reach the sea by almost rectangular bends to the westward through profound gaps in the coast range.

4. *The Lakes.*

The characteristic feature of nearly all the lakes of British Columbia is their great length and comparatively small breadth. They fill deep troughs in the valleys of the rivers at the heads or on the courses of which they lie. Babine Lake, at the head of the river of the same name, a tributary of the Skeena, is 87 miles in length, whilst its breadth varies from half a mile to 5 or 6 miles. François Lake, one of the western sources of the Fraser already alluded to, is $57\frac{3}{4}$ miles long, with an average breadth of only one and a half miles. Tacla Lake is 46 miles long and 3 miles broad, and nearly all the lakes in the province have somewhat similar proportions. Those above named, together with Stuart, Fraser, Cross, Upper and Lower Ootsabunkut, Chestatta, Tezzer Pinchi, Tchesinkut, Burns, and Decker, from 10 to 45 miles in length, and from 2200 to 2800 feet above the sea, are, Babine excepted, all tributaries of the Fraser, through the valley of the Nechaco, and lie between the 124th and 128th meridians and the 53d and 56th degrees of latitude. Babine Lake, the largest lake in British Columbia, has been so called by the French half-breeds in allusion to the fact that the Indians living on it had the custom of wearing a wooden labret, or lip piece, in the lower lip. The lake is known as Kit-Koin by the Tshimsians, and by the Carriers as Na-to-bun-kut, or long lake. The group of large lakes to which it belongs may be regarded as occupying two parallel valleys which

conform to the general north-westerly and south-easterly bearings, which govern the main features of the whole country between the Rocky Mountains proper and the coast. The physical features, climate, and vegetation of this great elevated lake region are described at length in the Reports of the Geological Survey of Canada, 1876-77, and 1879-80, and to these and their accompanying maps we must refer the reader for further details. The only other lakes of importance, some of which have already been mentioned, are Clearwater Lake, on a branch of the North Thompson; the Quesnelle Lakes south of the Cariboo goldfields; Lakes La Hache, Green, and Horse, near the waggon road; and still farther southward, on the east side of the Fraser Valley, the Shuswap, Kamloops, and Nicola Lakes, the latter discharging its waters by the Nicola River into the North Thompson at Spence's Bridge.

The interior mainland of British Columbia may be divided into three sections, each differing from the other in its attributes. The first extends from the mouth of Fraser River to the foot of the rapids above Yale; the second from that point to Alexandria; the third thence to the Rocky Mountains. The characteristic of the lower district is a surface thickly wooded in most parts with trees of enormous growth, chiefly varieties of the fir and pine, and intermixed with the red cedar. Low alluvial points fringe these thickets. These, as well as the numerous islets along the river, are covered with a luxuriant growth of aspen, balsam, poplar, and alder. In the lower part are some extensive meadows, yielding, in their natural state, heavy crops of a coarse but nutritious grass, and under cultivation enormous returns of cereals and other produce.

For a certain period of the year mosquitoes are troublesome along the river; but there has never been mani-

fested any symptom of fever and ague or other similar endemic, so often generated in positions of a like description.

On the verge of the second or central division a marked change commences. The copious rains which fall in the lower district are greatly modified after the mountain ridge, through which the river bursts near Yale, is passed. Evidences of a drier climate appear at every step. The character of the vegetation changes. About Lytton the Cactus begins to appear. In spots along the Thompson the Artemisia and other shrubs indicative of a dry and hot climate are found; and in lieu of the thickly-wooded luxuriance of the lower region, a succession of open valleys, covered with fine pasture, and bordered by grassy hills in parts more or less wooded, delights the eye of the traveller. Here and there belts of forest intervene, amid which broad expanses of open land lie scattered at intervals. This general description may be regarded as applying to a very large tract of country, extending from Alexandria on the Fraser, in latitude 52° 33′, to the southern boundary on the Okanagan River, and thence at intervals eastward to the base of the Rocky Mountains.

The third division of British Columbia, from Alexandria to the mountains, varies materially from the other two. The agricultural region, properly so called, may be said to terminate in the vicinity of Alexandria; though there are many small spots beyond that point which may be advantageously cultivated for culinary vegetables and the hardier cereals. Generally speaking, it is a wooded country, interspersed with large tracts of excellent soil and luxuriant pasture, especially in the direction of Fraser and Stuart Lakes, and on the Chilcotin high plains.

The Skeena River is the second largest river on the

Canadian Pacific coast. Its mouth is in latitude 54° 10′ north, and its sources interlock with those of the Fraser, the Peace, and the Liard. It has a general course from north-east to south-west of 300 miles, through a region of snow-clad peaks and glaciers. The tide ascends it for about 25 miles, and it can be navigated by stern wheel steamers for about 30 miles farther.

Above this it is only navigable for small boats or canoes, with many interruptions by falls and rapids. The forks, or Hazelton, is situated on the left bank of the river, about 140 miles from the sea, and a little above the junction of the Wat-son-kua, a large tributary from the south-east. It stands on an extensive flat, elevated 10 or 15 feet above the river, and at the base of a terrace which rises very steeply to a height of 170 feet. Two or three traders live here, and there is an Indian village of about half a dozen barn-like buildings, each inhabited by several families. The low ground about the forks, and the wide valleys of the Skeena, the Watsonkua, and the Kispyox, seem to be shut in on all sides by high mountain ranges. A triangular area of some 350 square miles, circumscribed by the valleys of the Skeena, the Watsonkua, and Kitseguecla, is occupied by the Rochers Deboule's Range. The north-east angle of this compact mountain mass is a magnificent rocky summit, with an altitude of 5955 feet above Hazelton, or 6680 feet above the sea. Among some of the peaks near it is a small glacier, and great masses of snow still lay in June on the upper part of the range. Looking down the valley of the Skeena the axial mountains of the Coast Range occupy the horizon, the highest point attaining a height of 8000 to 9000 feet. The Skeena district cannot be regarded as of much value agriculturally. On the lower part of the river—with the possible exception of a few islands—there is absolutely no good land. At

about 20 miles below the forks, however, the higher terraces at the sides of the river extend in some places several miles back from it, and show soil of a fair quality. It is stated that the valley continues to present the same appearance farther up, and it is certainly wide and low for some distance above the forks. A considerable breadth of land suited for agriculture is also found in the valley of the Kispyox to the north-westward. There may also be some good land in the wide valley of the Lakelse and Kitsumgallum, but unless in the event of some local demand arising, through the opening of mines, it will be long before these lands are utilised. The Skeena has been somewhat extensively used as a channel of communication between the Omineca gold mines and the coast, but it is by no means well adapted for this purpose. The large canoes that the Indians of the coast hollow from the cedar are generally employed on the Skeena. Large boats carrying about 15 tons have been worked up to the forks, but the native canoes are better adapted for the navigation. Freight brought up to Hazelton costs four dollars a hundred pounds. The Skeena River above the forks being exceedingly rapid, and the Babine River in the cañons quite impassable for canoes, the route for Babine Lake and the Omineca goldfields leaves the Skeena at the forks, and strikes nearly due east up the valley of the Suskwa River to Babine Lake, distant by the trail about 50 miles—in a direct line about 41. All goods are carried by Indians over this trail at a cost of $4·00 per 100 lbs. The Indians on the Skeena and the Nasse live in permanent villages. The total Indian population of the region is roughly estimated at 2075. From about 50 miles below the forks the country is occupied by rocks of Mesozoic age, in many places affording evidence of the probable existence of workable coal seams. These Mesozoic rocks are

associated with porphyrites and other felspathic rocks, which may be the result of contemporaneous eruptions of volcanic materials.

The *Yukon*, the largest American river flowing to the Pacific, discharges through several mouths opening into Bering Sea. Its length is estimated at 2000 miles, and it is navigable for steamers for 1200 miles from the sea. Its main northern branch, the Porcupine River, the mouth of which is near the limit of navigation, rises on the western slope of the Rocky Mountains, not far from tributaries of the Mackenzie; while the sources of its southern branch, Pelly River, interlock with those of the Liard or River of the Mountains, and of the Peel River, which flows northward to Mackenzie Bay on the Arctic Ocean. These three rivers, so far as known, drain the whole of the great triangular area in Canadian territory, the three sides of which, each about 700 miles in length, are formed by the northern boundary of British Columbia, the eastern boundary of Alaska, and the Rocky Mountains from Demarcation Point on the Arctic Ocean to the 60th parallel, enclosing an area of about 285,000 square miles. The Pelly River flows for 700 miles through this territory before entering Alaska. Of this north-westernmost corner of the Dominion but little is known with certainty. It has never been explored, and offers a fine field to enterprising travellers in search of untrodden tracts. In its mountainous character, and its rivers abounding with salmon, it chiefly resembles Norway; and had it included the coast of the Pacific, and the islands along with it, the resemblance would have been greater, for it would then have possessed a seaboard of fiords and inlets rendered temperate by the warm winds of the Pacific; but from Mount St. Elias down to Dixon's Entrance and Portland Channel, latitude 54° 40′, the

boundary of British Columbia, a narrow strip of American — formerly Russian — territory, intervenes along the Pacific coast, reaching back to the summit of the nearest mountain range, but nowhere exceeding 35 miles from the shore. The Rocky Mountains on the east side, the Blue or Peak Range, and the Cascade Mountains and Coast Range, run nearly parallel to each other, northwestwardly through this territory, with many intermediate ranges and groups. The Rocky Mountains, whose highest peaks rise to 16,000 feet above the sea at the sources of the Athabasca, gradually decline in height northward to 4,000 or 5,000 feet. The Coast Range, on the contrary, attains its greatest height at Mount St. Elias, which is stated to be 14,970 feet in altitude. These ranges cover much of this territory; but there are valleys between and among them, some of considerable extent.

That but little is known of this remote region is not surprising: as alpine in character as Switzerland and Tyrol, and eleven times as large as both together, it presents incomparably greater obstacles to exploration in the character of its climate and its inhabitants. It is certainly a natural bulwark to all military operations from the Pacific coast against the plain country to the east of it.

ON THE YUKON.

CHAPTER VII.

CLIMATE AND VEGETATION.

1. *General Review.*

THE study of the climatology of British America is yet in its infancy. There are, it is true, a number of records of the variations of the barometer and thermometer, and depths of rainfall, at various points, in addition to the valuable series of meteorological observations taken at Toronto and Montreal; but they have hitherto been disconnected, not viewed as contributions to the climatology of British America at large. One of the happy results of confederation will undoubtedly be the establishment of a system by which the corps of observers now scattered, or to be scattered, over all British America, will receive their instructions from a point within the Dominion, and transmit their experiences to a central station, not at Washington but in Canada, so that the critical examination of them may be made with a view to Canadian material interests, as well as to the advancement of climatological science.

Until such a system has been in operation for several years, it is impossible to write with accuracy a treatise on the climatology of British America. Nothing is more commonly misconceived than the climate of Canada. People do not seem to be aware that Canada stretches farther to the south than France, and that it reaches the latitude of Rome.

A line touching the most southern part of Canada on

Lake Erie, and carried directly east, would go through Spain and Portugal, the Mediterranean Sea, Italy at the point of Rome, the Adriatic, Turkey, and the southern part of the Black Sea.

Canada in its wide Dominion embraces the climates, and to some extent the winter colds, of the whole of Europe, from the extreme north to the south of France.

On a preliminary examination of the field, Newfoundland and Nova Scotia, whose skies are more influenced by their position in respect of the ocean than the land, naturally divide themselves from the rest of British America as a separate climatological province, having perhaps as a dependency the southern shores of New Brunswick. The rest of the country east of the Rocky Mountains partakes of the peculiar features of the continent at large, and the following may be mapped out as its subdivisions most distinctly marked:—

1. The North Shore of the St. Lawrence, from Labrador to Quebec.

2. New Brunswick, Prince Edward Island, and the South Shore of the St. Lawrence, to Quebec.

3. The Eastern Townships and the territory enclosed between the Upper St. Lawrence, the Ottawa, Lakes Huron and Ontario.

4. The Southern Peninsula of the Province of Ontario, jutting into and sloping towards Lake Erie. Also, the Peninsula between Lakes Erie and Ontario.

5. The North Shores of Lakes Huron and Superior.

6. The Prairie Country of the great West.

7. Nova Scotia.

The features common to all these regions are the severity of their winters and the heat of their summers, as compared with similar latitudes in Europe, and the rapidity with which summer treads on the heels of winter, leaving but little spring, in the European accep-

tation of the word. Taking Montreal as a fair medium for all Canada, the following is found to be the mean temperature of the several months, compared with London and Paris :—

	Jan.	Feb.	Mar.	April.	May.	June.
	°	°	°	°	°	°
St. Martin's (Montreal) lat. 45·32 N.	14·5	15·4	25·1	39·4	55·7	65·2
Paris (France) lat. 48·50 N.	35·5	39·5	44·0	49·7	58·1	62·7
London (England) lat. 51·29 N.	35·5	37·4	44·6	46·4	54·1	58·5

	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
	°	°	°	°	°	°	°
St. Martin's (Montreal) lat. 45·32 N.	72·3	67·5	58·7	45·0	32·2	17·4	42·4
Paris (France) lat. 40·50 N.	65·6	65·3	60·1	52·2	44·1	38·5	51·3
London (England) lat. 51·29 N.	59·6	62·7	58·0	47·4	42·9	40·4	49·0

Thus, while October, November, December, January, February, March, and April, are colder than in either London or Paris, and September colder than in Paris, May, June, July, and August are warmer than in either, and September warmer than in London.

The results of this difference are plainly marked in the differing vegetation of Europe and Canada. The orange, the olive, the fig-tree—all cultivated in districts of Europe where the mean temperature is less than that of Canada—perish under the influence of Canadian frosts; while on the other hand the high summer curve of temperature enables Canada to produce abundantly many semi-tropical fruits and vegetables to which Northern Europe is a stranger.

The agricultural capabilities of the North-East and North-West Territories of the Dominion, divided into six sections, may be briefly summarised as follows :—

1. The East main section has but little fertile land, and the climate is very severe.

2. The South Hudson Bay section, or that adjoining the south end of James Bay, has much good land, and is well adapted for the coarser grains as well as for roots and grasses.

3. The West and North Hudson Bay section from 60° north to the Arctic Ocean, is for the most part barren, and unsuited for anything but mining, fur trade, and fisheries.

4. The Mackenzie River country is much superior to section 3, to the east of it, in climate, and is well adapted for agriculture almost up to the Arctic Ocean.

5. The Pelly River section is the Switzerland of the Dominion, with considerable tracts in the valleys of fine farming land, and with a climate in the southern part much tempered by the Pacific winds.

6. The Red River, Saskatchewan, and Peace River country, south of the 60th parallel, is the great fertile prairie section in which nine-tenths of the land is fit for cultivation.

It here becomes desirable to treat separately of the various districts above enumerated.

1. *The North Shore of the St. Lawrence.*—The cold of Labrador is so excessive as to be a bar to settlement. The temperatures of Rigoulette, in lat. 54° 10′; Nain, 56° 30′; Hebron, 58°, have been observed. They differ but little, and give the following results as the means of the various months:—

	Jan.	Feb.	March.	April.	May.	June.
Labrador.....	-4°	-2°	8°	24°	35°	42°

	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Labrador.....	48°	51°	42°	31°	22°	6°	25°

The extreme of cold is, however, not so terrible as one might expect—the lowest recorded temperature being only −28°, and that was on 24th January 1859, on the 9th of which month Montreal suffered from −43°.

The Strait of Belle Isle once reached, however, the climate sensibly improves. Observations are rare, but the practical result of experience is that no part of the coast, from Belle Isle to Quebec, is uninhabitable from severity of climate. Wherever the soil permits, it can produce potatoes and turnips, the hardier garden vegetables, barley, oats, and hay; also, in great abundance, strawberries, raspberries, and currants; so that wherever the fisheries or the mineral resources of the district render it desirable that men should dwell, they can raise sufficient fresh vegetable food to maintain themselves in health. Their wheat, flour, and Indian meal—probably also most of their beef and pork—must always be imported; but this is the case, to a great extent, even in Newfoundland and Nova Scotia. As we ascend the St. Lawrence towards Quebec, a gradual and regular improvement manifests itself, and up the Saguenay River, around Lake St. John, there is a small tract which enjoys as high a summer temperature as Quebec, and where wheat and Indian corn will grow. This is, however, due to local peculiarities, and the line dividing this province from the next is pretty sharply drawn at Cap Tourmente, a few miles below Quebec.

2. *The South Shores of the Gulf and Estuary of St. Lawrence.*—In this province we enter upon the region where the culture of wheat becomes possible. Wheat is a cereal of very wide climatological range; but, as Blodgett observes, it is singularly affected by slight differences of heat and humidity. Thus, in England, whenever the mean of July and August is below 60°, the crop is deficient. In North America it seems to require for at least

two months a mean of 65°. This temperature is not attained on the Atlantic coast of Nova Scotia, where, moreover, the humidity of the atmosphere is too great for its successful cultivation. It is, however, reached almost throughout the interior of New Brunswick.

In Prince Edward Island wheat is as yet a failure; and it is not extensively cultivated near the north shore of New Brunswick. It seems, however, that these districts present a great analogy to Scotland in that particular. As was ably shown by the Duke of Argyle, in a paper read before the Statistical Society of London, the cultivation of wheat in Scotland was at one time uncertain in the best of years, and from the frequent failure of the crops famines were of constant recurrence. But when by drainage the temperature of the soil was increased, it became possible to sow wheat to an elevation on the mountain sides where only oats would grow before; and it is now a certain crop, and superior in quality. So it will be on the Gulf shore. The moisture of the air may perhaps prevent its growth in certain districts close by the sea, but when more capital and greater skill begin to be applied to the proper cultivation of the soil, wheat will apparently be a profitable crop throughout the region. This feature is, moreover, remarkable as regards wheat, that its quality, and the yield per acre, increase as it reaches its northern limit, in consequence of which the wheat of Gaspe has been successful at many an exhibition—an encouraging fact for the farmers of New Brunswick and Quebec.

3. *The Eastern Townships and the Territory of the Ottawa and the Upper St. Lawrence Valley.*—This extensive province is distinguished from the last as that in which the profitable cultivation of Indian corn becomes possible. The limiting condition for this staple seems to be a mean temperature of 67° for July, which is reached throughout this district.

In every part of this province, too, the hardier kinds of the grape vine, which is nearly coincident in range with Indian corn, ripen their delicious fruit. Here, too, the melon and tomato come to maturity, and the apple can be cultivated. This district is at present by far the most populous of the whole country. It contains the largest cities and the greatest amount of realised wealth. It is therefore desirable to look closely into the productions which its climate allows to be its staple.

The greater part of the Dominion is peculiarly favoured as respects climatological adaptation to the growth of wheat, but this part of it is that on which we chiefly rely for our supplies of this important cereal. The Richelieu district derived its name from its rich yield of agricultural produce, chief of which in former times was wheat, and the white wheat of Ontario is now famous. When the insect pests, which have for many years past injured the crops, have disappeared, Canada can boast of at least ten bushels to the acre more than any soil in the States which do not actually touch its boundaries, for the valleys of the Mississippi up to Central Iowa, and of the Ohio up to Cincinnati, are too humid and tropical for wheat; so is the southern part of Virginia, while even in Central Illinois and Southern Maryland quality and quantity both suffer.

The barley of this district is the best on the continent of America. It ripens here later in the year than in the more southern United States, on which account its grain is more plump and less liable to stain. Barley is essentially a northern cereal, and as long as the climate is colder than in the States, Canadian barley will be of better quality.

Oats, too, love the north. They yield more bushels to the acre in Canada than they do farther south, and probably weigh more per bushel.

Lorin Blodgett, the great authority on the climatology

of North America, says that maize yields most abundantly near its northern limit. It can hardly be said to be a staple in any part of Canada, but if this statement be correct it may become so.

One other matter deserves especial mention. We do not believe there is a single spot in any of the settled parts of Canada where the cultivated grasses will not thrive. Blodgett says that "on the sandy plains of New Jersey and in some parts of New England the English grasses fail, though the cause is not climatological. But on the prairies of some of the States east of the Mississippi the climate assists to limit them, through light summer temperature and long periods of drought. West of the Mississippi the climate is still less favourable, and as the soil has less of the retentive character in receding from the Mississippi, the favourite *cultivated turf* almost wholly fails." The truth appears to be that the extreme summer heat of the Middle States kills it; the winter cold of New England and many of the Western States, unaccompanied by snow, destroys it. The less torrid summers in Canada favour it, and by a covering of snow in winter its roots are preserved and invigorated. Hence, probably, the superior excellence of Canadian sheep both in flesh and fleece.

4. *The extreme South-west of the Province of Ontario.* —This is the tract most favoured by climate of any in Canada: the southern section of the peninsula of Ontario inclining towards Lake Erie, including also the regions between Lakes Erie and Ontario, and Lakes Erie and St. Clair. It is distinguished from the rest by its adaptability to the growth of many kinds of fruit, shrubs, and flowers which will not come to perfection in the rest of the Dominion. Here the peach ripens, as a standard, in the open air. The finer kinds of grape grow well; the vines needing little, if any, protection from winter frosts. In-

deed, the district close to the Niagara River, that near the Detroit River, together with the islands in Lake Erie, are better adapted for the cultivation of the grape than any of the more southern parts of Ohio or New York. The tulip tree blossoms, the catalpa is not cut down by frost, the chestnut bears; the finest kind of pears and apples can be cultivated.

The mean temperature of the months in this district is hardly established by a sufficiently long series of observations, but it is about as follows:—

	Jan.	Feb.	March.	April.	May.	June.
Windsor, Ontario.....	27·0	26·6	35·4	46·3	56·0	65·6

	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Windsor, Ontario...	69·7	67·5	60·0	47·7	38·2	26·9	47·8

5. *The North Shores of Lakes Huron and Superior.*—Little is yet known concerning these. In some parts, immediately on the shore, oats and barley grow well. To the northward, at the dividing ridge between waters flowing into the lakes and into the Hudson Bay, it is difficult to raise even potatoes. The capabilities of the intervening country are probably governed by local peculiarities —the configuration of the hills, the aspect of the slopes, the character of the soil.

We give the monthly temperature of Fort William, Thunder Bay, Lake Superior, etc. etc.:—

	Jan.	Feb.	March.	April.	May.	June.
Thunder Bay	5·7	8·2	22·7	31·4	48·9	58·7

	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Thunder Bay.....	62·2	58·8	48·2	41·9	23·4	18·1	35·7

6. *The Prairie Country of the West.*—Here the isothermal of the summer months rises rapidly. Fort Garry and the Saskatchewan have the same mean summer temperature as the most favoured parts of the St. Lawrence Valley —as Central Pennsylvania and Southern New England. The winter isotherm is that of Quebec. The natural vegetation is luxuriant, so travellers all agree. The farmers of the Red River Settlement produce fine crops of wheat and corn and hay. The soil is evidently rich, certainly in the basins of the Red River, the Assiniboine and the Saskatchewan, and there appears no reason why these regions should not very shortly become highly attractive to agricultural settlement.

7. *Nova Scotia.*—The general features of the climate of Nova Scotia are easily to be learned from the following table of mean temperatures of the months at Halifax, taken from a paper read before the Nova Scotia Institute of Physical Sciences, by Colonel Byers. Observations taken at Wolfville, in the interior of the country, and kindly forwarded by Professor D. F. Higgins, show a temperature a couple of degrees lower for the winter months, but higher in summer:—

	Jan.	Feb.	March.	April.	May.	June.
	°	°	°	°	°	°
Halifax	25·0	24·3	29·0	38·0	48·0	56·3
Wolfville	22·2	24·1	29·4	40·3	51·6	61·9

	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
	°	°	°	°	°	°	°
Halifax	62·3	63·7	57·0	47·0	39·3	25·7	43·3
Wolfville	67·5	65·5	58·3	49·2	39·3	26·7	44·6.

The agricultural productions of Nova Scotia are limited. Wheat will not grow near the coast and corn will not ripen, so that the people are obliged to import almost all their farinaceous food. There is, however, one

part of the province which is exceptionally favoured, viz. the Bay of Fundy shore. The winds seem to sweep into this bay, as into a funnel, from the mild waters of the Gulf Stream, and make of a couple of counties of Nova Scotia a garden where the plum, the pear, the best of apples, and many other such products, come to perfection, all the more astonishing from the contrast which the Atlantic and the Gulf coasts of the same province offer.

2. *Climate of North-West Territories and British Columbia.*

Proceeding west of the great lakes the isothermal line runs north-west; and west of the Rocky Mountains, on the Pacific face of the continent, the climate of Canada is not unlike that of Great Britain. Vancouver Island presents many analogies. And, in fact, the western face of the continent, to a point below the latitude of San Francisco, bears many resemblances to the climate of Western Europe. This is due to the fact that the tropical currents of the Pacific Ocean, and also the tropical winds, strike the western coast of America and produce modifying climatic influences which give warmth and moisture just in the same way that the polar current on the opposite coast produces refrigeration. The Pacific currents and prevailing westerly winds carry this warmth and moisture through the comparatively low passes of the Rocky Mountains into British territory, and redeem a large portion of the continent from the conditions of desert area so common in North America below the 50th degree of latitude until the tropical rains from the Gulf of Mexico are met.

In other words, we have in Canada climates and productions similar to those of the North-West and Central Europe—that is, of Russia, Norway, the British Islands, Denmark, Germany, France, Holland, Belgium, Switzer-

land and Northern Italy; and on the continent of America, the territory occupied by the Dominion of Canada is exactly analogous to that occupied by these countries on the continent of Europe.

The following notes by Professor Macoun on the climate of Manitoba and the North-West Territories are interesting:—

"The region included in the following observations lies between the boundary (latitude 49°) and latitude 60° north, these parallels forming the southern and northern boundaries of the territory, while it extends from the 95th meridian to the Rocky Mountains, following their north-western trend to latitude 60° north.

"For many years this vast extent of territory lay as a blank on the maps, almost unknown to Englishmen or Canadians, and counted valueless except as a fur-bearing country; yet, as long ago as 1812, Lord Selkirk said that the valley of the Red River alone would maintain a population of over 20,000,000. The people of the United States were always alive to its value, but, like *true* patriots, extolled their own country in preference to the land of the stranger. Over twenty years ago, their writers called attention to it, and Wheelock spoke glowingly of it in his work on Minnesota. Seven years since I had the good fortune to spend a number of months in the territory, and travelled over its whole extent from east to west, and, being impressed with its importance as a field for immigration, I have since then taken every opportunity to make myself acquainted with its climate and capabilities. In the following pages will be found my conclusions and the facts upon which they are based.

"Geologists have been aware for a length of time that high arid plains, about 40° north, always ameliorate the climate of countries north of them; and Blodgett, in his work on the Climatology of the United States, says

that high and arid plains are decisive of a high degree of summer heat, with an arid atmosphere and little rain or snow. Within the United States there are at least 500,000 square miles of arid country, almost constantly receiving enormous quantities of heat by day and giving it off at night by radiation. The general level of this plateau is fully 6000 feet. At Laramie City it is about 7000 feet above the sea, but from this point it rapidly falls off to the north, so that when it reaches the boundary (lat. 49°) at Pembina it is considerably less than 1000 feet in altitude, and at the base of the Rocky Mountains under 4000 feet. As the plain descends to the north the rainfall increases, the 'cactus' and 'sage-brush' give place to bunch-grass, and this, north of the line, soon passes into sward, quickly followed as we proceed northward by copse-wood, which, north of the Saskatchewan, is replaced by an aspen forest, and this on the watershed into one of spruce. No appreciable alteration in temperature takes place, but only an increase of moisture, as we pass to the north, and with this increase of humidity a more equable temperature is noticed. Less radiation takes place as we leave the high treeless plains, and, consequently, the variation of temperature is less strongly marked between day and night.

"A careful examination of Blodgett's and Dove's charts shows that the isothermals curve upward from the Gulf of Mexico, and reach their northern bend, in the United States, on the 110th meridian. In lat. 50° the mean summer temperature is placed at 70°, while at Winnipeg, 600 miles to the east, it is 65°. Following these lines 9° farther north, we find that the isothermal of greatest heat passes Fort Vermilion, lat. 58.24, on the Peace River and Edmonton on the Saskatchewan, both of these points being noted for their productions. On the Pacific side the isothermals commence to curve north from the

head of the Gulf of California, reaching our boundary at the 115th meridian, having actually crossed the Rocky Mountains before reaching this point, thus producing those warm dry winds of the south-west, which are known in Montana and north of the boundary as 'Chinook Winds.' These winds are noticed more particularly in winter, and often raise the temperature over 60° in the course of an hour or two. They are noted for being both warm and dry, as they evaporate the snow as fast as they melt it. Their effects are not much felt north of lat. 52°, and how far east they extend is not known.

"Here, then, we have two currents of warm air flowing constantly into our territory, the one from the Gulf of Mexico, the other from the Gulf of California, and unitedly giving us heat and moisture which they have carried over the 'Great American Desert' to leave on the lower plain to the north. Owing to the height and aridity of the 'Desert' much heat is absorbed during the day, but it is constantly sent into the atmosphere at night, causing the air above the plain to be just as warm at night as during the day. Fort Laramie, in Wyoming Territory, is in the same latitude as Boston, and yet, strange to say, the former, although 7000 feet above the sea, has a summer temperature as high as the latter. A very little reflection will show that, were the 'Desert' an inland sea, the winters of our interior would be like those of Eastern Europe, and we would have a cooler summer and a warmer winter. In an article like the present it would be out of place to discuss the climate of Eastern Europe, but the forces which enable the Russian to build his capital almost on the 60th parallel are precisely the same as those which send the warm air of the gulfs to ameliorate the climate of our own North-West, and cause wheat and other cereals to be produced, in the highest perfection, as far north as this same parallel.

"After temperature, the most important factor is humidity, and here again we have a remarkable example of a well-known natural law. As stated above, the winds are constantly drifting northward, and in winter, owing to their passage across the 'American Desert,' which is now very cold, they lose most of their moisture, and pass over our prairie as dry winds. In summer the very reverse of this takes place—the dry, hot plains prevent deposition, and hence the winds come loaded with moisture, and give the summer rains which cause such astonishing growth in June and July. In most cases, this dryness of the atmosphere is injurious to growing crops, but, owing to the situation of the plains, in our case it is a positive good, the rains coming just when wanted, and ceasing when of no further use to the growing crop. The following data, taken from the Meteorological Report of 1876, illustrate this.

	Winter.	Spring.	Summer.	Autumn.
Quarterly rainfall at Winnipeg . .	00·	5·69	10·52	0·04
,, ,, Toronto . . .	5·51	6·63	5·74	3·18

	1st half of year.	2nd half of year.
Snowfall, in inches, at Winnipeg	28·6	29·7
,, ,, Toronto	67·7	45·7

It will be seen by the above table that the rainfall at Winnipeg in summer and spring is nearly equal to that of Toronto for winter, spring, and summer; and where Toronto has over three inches in autumn, Winnipeg has scarcely any. The absence of autumn rains in the west is a priceless boon, as it enables the farmer to thresh and harvest his grain without injury, and, besides, gives him excellent roads when he needs them most.

"The progress of the seasons and the labours of the husbandman, throughout the North-West, may be summed up as follows:—Early in April the hot sun dissipates the slight covering of snow, and almost immediately plough-

ing commences, as, after the frost is out six inches, spring work may begin. Seeding and ploughing go on together, as the ground is quite dry, and in a few days the seed germinates, owing to the hot sunshine. By the time the rains and heat of June have come, abundance of roots have formed, and the crop rushes to quick maturity.

"After the middle of August the rains almost cease, and for ten weeks scarcely a shower of rain falls, giving the farmer ample time for harvesting. These general characteristics apply to the climate of the whole North-West, and the same results are everywhere observed over tracts embracing 300,000 square miles of territory. One important result of this peculiar climate is the hardness and increased weight of the grain. Another, equally important, is the production of natural hay, on which horses and cattle thrive much better than when fed on made hay. All stock-raisers know that it is not cold that injures cattle or horses, but those storms of sleet or soft snow which are so common in Ontario and the Eastern Provinces. Such storms as those are never seen in the North-West, and the cattle are never wet from November to April.

"Many intelligent persons are afraid of the winters of the North-West, because they estimate the effect of the cold by the thermometer instead of by the humidity of the atmosphere. J. A. Wheelock, Commissioner of Statistics for Minnesota, wrote as follows concerning the atmosphere of that State, over twenty years ago:—'The dryness of the air in Minnesota permits a lower range of temperature without frosts than in moist climates. The thermometer has frequently been noticed at twenty degrees without material injury to vegetation. In the damp summer evenings of Illinois and Ohio, for example, the heat passes off rapidly from the surface of the earth and from plants. Frosts develop under such circumstances

at a comparatively high temperature. The constant bath of moisture has softened the delicate covering and enfeebled the vitality of plants; and thus a fall of the thermometer, which in Minnesota would be as harmless as a summer dew, in Ohio would sweep the fields like a fire.'

"What Wheelock says of Minnesota is equally true of the North-West Territories, and more so, as they are certainly drier than it. Dry air is a non-conductor of heat, and as the dryness increases with the lowering temperature, the increasing cold is not felt by either animals or plants, and we find a solution to the paradox, that, although water may freeze, vegetation is not injured except when a humid atmosphere is in immediate contact with it. The increase of dryness in the air has the same effect as an increase of warm clothing for man and beast, and we suffered less from a temperature of 10 degrees below zero, lying in tents, without fire, than we would have done in Ontario with 10 degrees of frost. Without the aid of a thermometer no one would believe the cold was so intense.

"There is then in this region a dry clear cold winter, a dry spring with bright sunshine, a warm summer with abundance of rain, but not necessarily a cloudy sky, and a dry serene autumn, with possibly a snowstorm about the Equinox.

"A country of almost boundless extent, with a climate like this and a soil of astounding fertility, may well be described in the words of Lord Beaconsfield as a land of 'illimitable possibilities.'"

The climate of the valley of the Mackenzie River is much milder than that of the section east of Lake Winnipeg in the same latitude, from which it differs in many respects that render it more valuable. Instead of being a rocky and for the most part infertile gneiss and granite

formation, it is an alluvial plain, underlaid by palæozoic strata, chiefly limestone, and is more or less wooded throughout, almost to the shore of the Arctic Ocean. In the southern half of it barley and garden vegetables can be raised, and it abounds in workable beds of lignite coal. Its rich alluvial soil and superiority in climate, due in part perhaps to the prevalence of limestone, is such as to admit of the growth of trees as far north as the mouth of the river. Though in this region generally stunted and of the hardiest kind (white spruce), they sometimes attain a useful size in sheltered positions. Even at the north-eastern extremity of this section, in a sheltered grove at the mouth of the Coppermine River, one is noticed as being 37 inches in girth, 20 feet without taper, and 50 feet in height; but such trees are there exceedingly rare. The character of the surface already described would have made it a good agricultural country had its climate permitted. Such as it is, though its southern boundary is the limit of profitable wheat cultivation, Colonel Lefroy and Sir John Richardson say that at 50 miles farther north, with a mean temperature in summer of 59½° Fahrenheit, barley grows well; and the latter says that at Fort Norman, 340 miles north of latitude 60°, potatoes are raised, and in good seasons barley ripens well, and that latitude 65° may be considered in this region the northern limit of the growth of barley. He adds that at Fort Good Hope, 150 miles north of Fort Norman—that is, close to the arctic circle—turnips attain the weight of two or three pounds in favourable seasons, but barley has failed there when tried. If therefore a line be drawn between 60° and 65° north latitude, there is to the south of it, in this valley, an area of 120,000 square miles, which, with the necessary allowance for waste land and portions unfavourable through elevation or aspect, admits of the

growth of barley as well as vegetables, and that would admit of the growth of rye on its northern limit.

The following notes by Dr. G. M. Dawson, which we give in an abridged form, respecting the climate and vegetation of British Columbia and the Peace River country, are taken from the Report of the Geological Survey for 1879-80 :—

"The climate of the coast of the northern part of British Columbia, while not subject to great extremes of temperature, is excessively humid, with much rain at all seasons of the year and occasional heavy falls of snow in winter. Neither Esquimalt nor New Westminster, which are the only regular meteorological stations maintained near the coast of the Province, give any criterion by which to arrive at a knowledge of the climatic conditions of other districts; for both these places—but especially Esquimalt—are sheltered from the excessive precipitation which occurs where the moisture-bearing winds first strike the high coast-line. Observations maintained by myself while engaged in a geological examination of the Queen Charlotte Islands, during the summer of 1878 (published as an Appendix to the Report of Progress of the Geological Survey, 1878-9), fairly represent the climate of that region during a few months. Observations kept up during many years at Sitka, two and a half degrees north of Fort Simpson, and considerably farther west, doubtless represent a climate considerably worse than that of the northern part of the coast of British Columbia. It may, however, be useful to extract from these the following facts. The latitude of Sitka is 57° 3′, or about one degree north of Glasgow (Scotland). Temperature observations extend over a period of 45 years with little interruption. 'The mean temperature of spring is 41·2°; for summer, 54·6°; for autumn, 44·9°; for winter, 32·5°; and for the entire year, 43·3°, F.

The extremes of temperature for 45 years are 87·8° and −4·0°. However, the mercury has fallen below zero of Fahrenheit in only four years out of the 45, and has risen above 80° during but seven years of that period. The coldest month is January, the warmest August; June is slightly warmer than September.' The mean of the minima for seven years of the above period is 38·6°, and of the maxima for seven years, 48·9°, showing a remarkably equable climate. The average annual amonut of rain, melted snow, and hail, from 1847 to 1864 (with the exception of the year 1855), was 82·66 inches, or within a fraction of 7 feet; and the average annual number of days on which rain, snow, or hail fell, or heavy fogs prevailed, was 245, or two days out of three, while it does not follow that the other days have a clear sky. Tables by Lütke, from observations in 1828 and 1829, show that on an average each year there were 170 days calm, 132 days moderate winds, and 63 days with strong winds.

"The excessive rainfall, considered in conjunction with the fact that the sky throughout the year is essentially cloudy, preventing rapid evaporation and keeping the dew-point near the actual temperature of the air, accounts for the peculiar character of the vegetation, and the fact that ordinary cereals cannot be grown in the districts exposed to these conditions. At Fort Simpson, on the west coast of the Queen Charlotte Islands, and elsewhere, many of the hills are but partially covered with forest, the remainder of the surface being occupied by sphagnous moss several feet in depth, and saturated with water even on steep slopes. The low north-eastern part of the Queen Charlotte Islands is in great measure sheltered from the rain-bearing winds, and constitutes, in fact, the only extensive area of land which appears to be suitable for agriculture on the northern part of the coast. Mr.

Duncan, of Metla-Katla, who kept a meteorological register for some time after his first arrival in the country, estimated that there were on an average about seven fine days in a month in that place. The behaviour of the winds and barometer in both Vancouver and the Queen Charlotte Islands appear to indicate that the centres of most storms, travelling from west to east, pass to the northward of the coast of British Columbia. This being so, it is probable that the force of the gales is somewhat greater on the northern part of the coast of the province than on the southern.

"The cause of the exceptional mildness of the climate of this region is to be found not alone in the fact of the proximity of the sea, but in the abnormal warmth of the water, due to the Kuro-Siwo or Japanese Current.

"Many of the islands lying off the northern coast of British Columbia, and forming the great archipelago which fringes it, are low; but, though covered with luxuriant forest, possess very little soil, and are in many cases composed of almost solid rock. About Metla-Katla and Fort Simpson small patches of ground are cultivated by the Indians as potato gardens, and good crops secured; but the total area of arable land existing on this part of the coast, with the exception of the portion of the Queen Charlotte Islands before referred to, is so inconsiderable as to be scarcely worth mention.

"The coast about Fort Simpson and the mouth of the Skeena is very imperfectly sheltered from the rain-bearing winds by the Queen Charlotte Islands; while the islands of the coast archipelago, being for the most part of moderate elevation in this region, abstract little moisture. Where these winds first impinge on the mountainous mainland the heaviest precipitation occurs, in exact correspondence with the height to which the moist air is forced up into the higher regions of the atmosphere,

and cooled there by its expansion and loss of heat by radiation. As the mountains attain a considerable elevation at the coast, and the increase in elevation of the peaks towards the axis of the range is comparatively gradual, the heavy rainfall of the coast is not found to be maintained in travelling eastward by the Skeena River. At 45 or 50 miles above Port Essington, evidence of decreasing moisture is found, and is still more clearly apparent when Kitsalas Cañon, about half-way from Port Essington to the forks of Skeena, is reached. The devil's club and skunk cabbage (*Echinopanax horrida* and *Lysichiton Kamtschatsense*), luxuriant in the lower reaches of the river and indicative of a humid climate, no longer abound.

"At Quatsalix Cañon, 95 miles from the coast, the highest summit of the coast range having been passed, the vegetation characteristic of the northern interior of British Columbia may be said to set in; the western scrub pine and aspen (*Pinus contorta and Populus tremuloides*) growing abundantly on the flats and slopes. The change is so gradual, however, and the blending of the coast and interior floras on the Skeena so complete, that it is difficult to assign the precise position of the line.

"With regard to the snowfall on the Skeena, Mr. H. J. Cambie, during his survey here in 1877, gathered that from Port Essington to near the mouth of the Lakelse (56 miles), it was exceedingly heavy, reaching a depth of 10 feet or more. From this place to Kitsalas Cañon it reaches, at least occasionally, a depth of 6 feet; while about Kitwungah (16 miles below the forks) it averages 3 feet. So far as information can be obtained from the Indians, it appears to confirm these estimates.

"The Skeena usually opens during the last week in April or first week of May. Ice begins to run in the

river early in November, but the river does not generally freeze till the end of December. The river being very rapid, the occasion of its freezing is usually the occurrence of a thaw. This sets free great quantities of anchor ice, sometimes very suddenly, blocking the river and causing it to freeze over. In 1867 the river closed on the 13th of November, which was exceptionally early. The river is generally highest in July, deriving most of its water from the melting snow on the mountains. It is lowest immediately after the ice goes.

"Of the Watsonkua River, which joins the Skeena from the south-eastward at the forks, Mr. Cambie reports that the valley throughout its entire length is in part prairie and sustains a magnificent growth of grass, but is subject to frequent summer frosts and unsuited to agriculture. The Sus-kwa Valley, which joins the Watsonkua, and up which the trail from the forks towards Babine Lake runs, contains no agricultural land worth mention, but its northern side has been in many places very completely burnt over, and is covered with exceedingly luxuriant grass and pea-vine, forming an excellent summer range for cattle or horses.

"Babine and Stuart Lakes occupy portions of a single great valley, which is bounded by mountainous country on either side, and communicates northward with the flat country of the Lower Nechacco. The upper end of the lake rarely freezes completely across, but this is due, not to the mildness of the winter, but to the great depth of the water. A terrace at a height of about 200 feet is specially prominent round the lake, and after reaching this height the land frequently runs back several miles as a level or gently-undulating plain. In other places it slopes gradually up, reaching an elevation of 500, 600, or 800 feet above the lake, at from two to five miles from it. The valley is not even then

shut in by high mountains in its central part, but appears to continue at nearly the same or a lower level in some places for many miles. The woods are generally light, aspen and poplar frequently preponderating over spruce, and considerable tracts with a southern exposure, from which fire has removed the forest, are covered with luxuriant grass, pea-vine, epilobium, etc. The portage between Babine and Stuart Lakes is low, across wide-spreading benches, and from half to one-third of the surface appears fit for cultivation. Considerable areas of low land also border Stuart Lake.

"The northern or lower extremity of Babine Lake being more closely hemmed in by snow-clad mountains, is evidently less favourably situated than the remainder of this lake and Stuart Lake, and vegetation was found to be decidedly behind that of the Sus-kwa Valley. Mr. Sanpere, who is in charge of two Hudson Bay posts, one at the north end, the other at the middle of Babine Lake, states that at the latter he can grow potatoes and many kinds of vegetables, and that his predecessor grew barley, which ripened well.

"The portion of the Peace River country, for which the exploration of last season enables pretty accurate general information to be given, may be considered as extending eastward from the middle forks of Pine River. West of this point, as already stated, the areas of fertile land are small, being confined to certain river valleys which penetrate the foot hills of the Rocky Mountains and high plateau attached to them. With this western limit, the region now to be described may be considered as bounded to the north by the 57th parallel, to its intersection eastward with the Peace River. Thence the boundary may be assumed to follow the Peace River southward to the mouth of Heart Brook, near the confluence of the Smoky River. Thence to run south-eastward

to the extremity of Lesser Slave Lake, to follow the western border of the hilly region lying to the south of the lake to the Athabasca River; thence to follow the Athabasca westward to the foot hills, and skirting the foot hills to run north-westward to the first-mentioned point on Pine River.[1]

"The tract included within the limits above given has an area of about 31,550 square miles, and by far the larger part of this area may be classed as fertile. Its average elevation may be stated as little over 2000 feet, and this is maintained with considerable uniformity; for though the general surface slopes slightly from the north and south toward Peace River, the region as a whole may be considered as a plateau through which the great gorge-like valley of the Peace has been excavated. This valley has in general a depth of 600 to 800 feet below that part of the plateau bordering it, with a width of two to three miles from rim to rim. Its tributary streams, at first nearly on the plateau level, flow in valleys of continually increasing depth as they approach that of the Peace River. Those from the south-eastern portion of the region rise either in the Rocky Mountains, or near the Athabasca, the tributaries received by the latter stream from the north and north-west being—with the

[1] "In addition to the area above defined, my explorations and those of my assistant, Mr. M'Connell, during the past season, included an examination of the upper part of the Athabasca to Athabasca Landing, of the north shore of Lesser Slave Lake and Lesser Slave Lake River, of a route from the east end of Lesser Slave Lake to old Fort Assiniboine, and thence to Edmonton, and of the road from Athabasca Landing to Edmonton. Also of the Athabasca from the Landing to the mouth of the Rivière la Biche, by the valley of the latter to Lac la Biche, and thence to Victoria and Egg Lake. The country examined on these lines is not included in the present report, as being less homogeneous in character than the great region above defined, it requires to be treated at greater length and in more detail. It may suffice for the present to state that considerable areas of fertile land are found throughout, but more particularly in the region south of the line of the Athabasca River."

exception of the Batiste—quite inconsiderable in this part of its course.

"The ridges and hills by which this region is occasionally diversified appear in all cases to be composed either of the generally soft rocks of the Cretaceous and Tertiary or of arenaceous clays containing erratics, and representing the boulder clays of the Glacial Period. These elevations are generally slight, and with exceedingly light and gradual slopes, the scarped banks of the streams constituting much more important irregularities. These ridges, however, often resemble detached portions of a higher plateau, and spread widely enough to occupy in the aggregate a considerable area, of which the soil is not so uniform in character as elsewhere. With these exceptions, the soil of the district may be described as a fine silt, resembling the white silts of the Nechacco Basin previously referred to, and not dissimilar from the loess-like material constituting the subsoil of the Red River Valley in Manitoba. This silt, at a short distance below the surface, is grayish or brownish in colour, but becomes mixed superficially with a proportion of vegetable matter to a varying depth. It has evidently been deposited by a comparatively tranquil body of water not loaded with ice, probably toward the close of the Glacial Period, and has either never been laid down on the ridges and undulations above referred to, or has been since removed from them by natural processes of waste. As evidenced by the natural vegetation, its fertility is great.

"West of the Smoky River, both to the south and north of Peace River, there are extensive areas of prairie country, either perfectly open and covered with a more or less luxuriant growth of grass, or dotted with patches of coppice and trees.

"The northern banks of the Peace River Valley are also very generally open and grassed, and parts of the

valley of the Smoky and other rivers have a similar character. The total area of prairie land west of the Smoky River may be about 3000 square miles. The remainder of the surface is generally occupied by second-growth forest, occasionally dense, but more often open and composed of aspen, birch, and cottonwood, with a greater or less proportion of coniferous trees. Some patches of the original forest, however, remain, particularly in the river valleys, and are composed of much larger trees, chiefly coniferous, among which the black spruce is most abundant. Handsome groves of old and large cottonwoods are also to be found in some of the valleys. Where the soil becomes locally sandy and poor, and more particularly in some of the more elevated parts of the ridges before described, a thick growth of scrub pine and black spruce, in which the individual trees are small, is found; and in swampy regions the tamarack is not wanting, and grows generally intermixed with the black spruce.

"East of the Smoky River, and southward towards the Athabasca, the prairie country is quite insignificant in extent, the region being characterised by second-growth woods of the character just described, which, on approaching the Athabasca, are replaced by extensive and wellnigh impassable tracts of *brûlé* and wind-fall, in which second-growth forest is only beginning to struggle up.

"Though the prairies are most immediately available, from an agricultural point of view, the regions now covered with second-growth and forest, where the soil itself is not inferior, will eventually be equally valuable. The largest tract of poor land is that bordering the valley of the Athabasca on the north. This rises to an elevation considerably greater than most of the region to the north and west, and appears, during the submergence to which the superficial deposits are due, to have been exposed to stronger currents, which have prevented the

deposition of the fine silt, causing it to be replaced by a coarser silt, which passes in places with actual sand, and alternates with ridges of boulder clay. This region is also often very swampy, and for a width of twenty to twenty-five miles on the trail from Sturgeon Lake to the Athabasca is quite unsuited to agriculture, though still in many places capable of yielding good summer grazing when the forest has been completely removed by fire. To the northward, more particularly to the east of Smoky River, peaty and mossy swamps occupy part of the surface, and these may be regarded as permanently unsuited to agriculture.

"There is also a sandy track, though of small width, along the lower part of the Elk River near its junction with the Smoky. Deducting, as far as possible, all the areas known to be inferior or useless, with about twenty per cent for the portions of the region under consideration of which less is known, the total area of land, with soil suited to agriculture, may be estimated as at least 23,500 square miles. In the absence of complete maps, such an estimate cannot be otherwise than very rough, but may serve to give some idea of the fact.

"Whatever theory be adopted, and may have been advanced, to account for the wide prairies of the western portion of America farther to the south, the origin of the prairies of the Peace River is sufficiently obvious. There can be no doubt that they have been produced and are maintained by fires. The country is naturally a wooded one, and where fires have not run for a few years, young trees begin rapidly to spring up. The fires are, of course, ultimately attributable to human agency, and it is probable that before the country was inhabited by the Indians it was everywhere densely forest-clad. That the date of origin of the chief prairie tracts now found is remote, is clearly evidenced by their

present appearance, and more particularly by the fact that they are everywhere scored and rutted with old buffalo tracks, while every suitable locality is pitted with the saucer-shaped 'buffalo wallows.' It is reported that a few buffaloes were seen last year near Pine River, but the animal has now become in the Peace River country practically extinct—an event which, according to the Indians, happened at a date not very remote, owing to a winter of exceptional severity, during which the snow 'reached to the buffaloes' backs.'

"The luxuriance of the natural vegetation in these prairies is truly wonderful, and indicates, not alone the fertility of the soil, but the occurrence of a sufficient rainfall. The service-berry (or amalanchier) and the choke-cherry are very abundant in some places, particularly on the so-called Grande Prairie, which constitutes the great berry gathering ground of the Indians.

"With regard to the climate of the Peace River country, we are without such accurate information as might be obtained from a careful meteorological record, embracing even a single year, and its character can at present be ascertained merely from notes and observations of a general character and the appearance of the natural vegetation.

"It may be stated at once that the ascertained facts leave no doubt on the subject of the sufficient length and warmth of the season, to ripen wheat, oats, and barley, with all the ordinary root crops and vegetables, the only point which may admit of question being to what extent the occurrence of late and early frosts may interfere with growth.

"While regretting that the data at disposal for the determination of the agricultural value of the Peace River country are not more ample, we may, I believe, arrive with considerable certainty at the general fact that

it is great. From such comparison as can be made, it would be premature to allow that the climate of the Peace River is inferior to that of the region about Edmonton or the Saskatchewan. It is true that in both the Saskatchewan and Peace River districts the season is none too long for the cultivation of wheat, but if the crop can be counted on as a sure one—and experience seems to indicate that it may—the occurrence of early and late frosts may be regarded with comparative indifference. The season is at least equally short throughout the whole fertile belt from the Peace River to Manitoba, though early and late frosts are not so common in the low valley of the Red River. The almost simultaneous advance of spring along the whole line of this fertile belt is indicated by the dates of the flowering of the various plants. It is further unquestionable that the winter is less severe, and not subject to the same extremes in the Peace River and Upper Saskatchewan regions as in Manitoba.

"In addition to the favourable climatic conditions indicated by the thermometer, the length of the day in summer in the higher northern latitudes favours the rapid and vigorous growth of vegetation, and takes the place, to a certain extent, of heat in this respect. This has been supposed to be the case from the luxuriant vegetation of some northern region, but Alfonse de Candolle has put the matter beyond doubt by subjecting it to direct experiment. In latitude 56°, which may be taken as representing that of much of the Peace River country, sunrise on 21st June occurs at 3h. 12m., sunset at 8h. 50m.; while six degrees farther south, in latitude 50°, which may be assumed to represent Manitoba, sunrise occurs on the same day at 3h. 49m., sunset at 8h. 13m. The duration of sunlight, in the first case, is 17h. 38m.; in the second, 16h. 24m., or one hour and a quarter in excess in the northern

locality. This excess, of course, decreases to zero at the spring and autumn equinoxes, and the difference is reversed in the winter.

"A further circumstance giving to the Peace River country and that on the upper part of the Saskatchewan, other things being equal, a value as farming land acre for acre considerably greater than that of most parts of the North-West, is the immunity of this region from the visits of the devastating locust or grasshopper (*Caloptenus spretus*)."

From the foregoing it will be seen that the climate of all British America is what Blodgett calls "formidable." It, moreover, presents its most unfavourable features to the stranger or the casual visitor.

All vessels coming from Europe cross the banks of Newfoundland. "It is a dreary locality," says the Right Rev. Dr. Mullock, of St. John's, "and the almost constant fog and drizzling rain, the doleful sound of the fog-horn, with ships' guns calling their crews, the troubled ocean, the ships rolling almost under the waves, as they ride at anchor by their hempen cables, steadied by their main or tugsails in addition to their moorings,—all these make an impression on a stranger which he never after forgets. . . . And he is surprised when he is told that for ten months in the year all the fog and damp of the Banks goes to the other side of the Atlantic, while we (in Newfoundland) never have the benefit of it unless what we call the out-winds blow."

Again, Canadian railways pass through the least inviting sections of the country. The farmer naturally builds his house to face the gravel road, and not the railway; the railway company seeks out the least improved and therefore least expensive track, also in most cases the neighbourhood of valleys not yet reclaimed from swamp. He that travels by rail from Halifax to

Windsor, N.S., from Quebec to Montreal, from Prescott to the capital at Ottawa, or on almost any other route, and forms his opinion of the country by the rocky or swampy or sandy deserts he passes through, falls into serious error.

So with Canadian rivers. The banks of many of them are not yet cultivated, owing to the rising of the waters in the spring. It is only in old settled localities that habitations, fields, and meadows can be seen from the steamers' decks.

But somehow it often happens that where nature is most formidable, nay, most repulsive to the careless observer, she is kindest to the loving wooer and most liberal to the patient worker. The leaden skies which cover the Banks of Newfoundland point out from afar the haunts of a fish more valuable far to man than all the painted denizens of Southern waters. The snows which in winter hide the soil of Canada cover also farms which yield more merchantable products to the acre than the lands of the more balmy South. As taxation is said by the political economist not to be an unmixed evil in that it is an incentive to exertion, so the rigour of Canadian winters, even when not directly beneficial as it is in some cases, appears but to stimulate Canadians to profitable exertion in the summer.

The map accompanying J. A. Hurlbert's *Climates, Productions, and Resources of Canada* not only clearly shows the areas adapted for wheat and the coarser grains and grasses, but affords a comparison with corresponding areas in Europe, and to this, and the *Physical Atlas* of the Dominion of Canada by the same author, the reader is referred for more detailed illustration of these points.

If still further testimony were required concerning the agricultural capabilities of the great Canadian North-West, it is conclusively afforded by the following extracts from an able and exhaustive article on the "Wheat-fields

of the North-West," published in the September (1881) number of *Harper's Monthly Magazine*:—

"The superior quality of the wheat raised in this new country will be best shown by a comparison made in figures. Duluth and Chicago are selected to furnish a comparison, as the former is the general point of shipment of the northern wheat, and the latter is the place of largest receipts in the grain States farther south. To explain the use of the figures below, it may be noted that, for the convenience of trade, on arrival at one of the larger places of receipts, grain is inspected by experts who are public officers, and graded according to its soundness and weight. The difference in market value between the grades is considerable. Take for the purpose the crop of 1880. During the last three months of that year there were inspected at Duluth 1,778,764 bushels of wheat. Leaving out of consideration the fraction 86,000 bushels, which were of the soft variety, and, it is assumed, came to this port from southern counties of Minnesota, the wheat graded as follows, the amounts being expressed by per cent:—

AT DULUTH.

Grade No. 1, Hard	87 per cent.
Grade No. 2	11 „
Grade No. 3	1 „
Rejected	1 „

During the same months there were inspected at Chicago 1,571,262 bushels of winter wheat, and 7,988,816 bushels of spring wheat, which graded as below:—

AT CHICAGO.

Winter Wheat.		*Spring Wheat.*	
Grade No. 1	1 per cent.	Grade No. 1	1 per cent.
Grade No. 2	53 „	Grade No. 2	66 „
Grade No. 3	34 „	Grade No. 3	23 „
Rejected	12 „	Rejected	10 „

As to the respective market values: at the city of Buffalo, where the northern and southern grain, coming over the lakes from Duluth and Chicago, first meet in a general market, the following were the average prices per bushel during the months mentioned above:—

No. 1, Hard Duluth . . .	1·18		
No. 2, „ . . .	1·15½		
No. 1, Red Winter . .	1·14	No. 1, Spring . . .	1·13½
No. 2, „ . .	1·11	No. 2, „ . . .	1·08
No. 3, „ . .	1·06	No. 3, „ . . .	0·95
Rejected „ . .	1·00	Rejected „ . . .	0·80

The southern grown wheat may have in the future, it is probable, a still lower relative value.

"The hard northern wheat, instead of being the lowest, has taken its rightful place as the highest priced on the list of grain.

"The land is also more prolific. The experience of the wheat-raisers in Manitoba has now been of sufficient length to make understood some of the natural advantages extended to this country for returning large and certain crops. Situated in a high latitude, there is afforded to vegetation a greater number of hours of sun each day during the entire season of growth. The winter cold, continuous and with light falls of snow, freezes the ground to an extraordinary depth. Under the disintegrating power of frost, the lower soil is broken up each season for the sustenance of plants as thoroughly as if done by the best artificial means. This is not the only service performed by the frost; later, throughout the period of growth, it keeps within reach of the roots a moisture which renders drought impossible. But most noteworthy is the soil itself—an alluvial black loam, with an average depth of twenty inches, resting on a subsoil of clay. It is very heavy when wet, having a tar-like consistency, and rich in the elements which are believed to nourish

vegetation. Dropped into this soil, with the other favouring circumstances, seed springs up and grows with an extraordinary vigour, and gives a sound and abundant crop. The average yield of wheat per acre in the Red River Valley, north of Fargo, where the soil becomes heavier and more characteristic, is twenty-three bushels. In Manitoba and the Saskatchewan region the average is greater, and amounts to twenty-eight bushels. These facts become more striking when compared with results in the district of the wheat supply at present. In Illinois the average for wheat to the acre is seventeen bushels; in Iowa, ten; in Wisconsin, less than ten; in Kansas, ten; while in Texas it is eight and one-half bushels. Nor does the land seem to deteriorate under a course of cropping, as does the lighter soil of States in the south.

"In the parish of Kildonan, on the Red River, there are fields which have been sown to wheat every season for the last thirty-five years without the application of any fertilisers, and which in 1879 yielded an average of over thirty bushels to the acre. A soil which raises one grain in such perfection is, of course, suitable for other purposes. Stimulated by the presence of buyers for the mills making the high-priced flour who offer immediate payment for all their crop, the farmers have so far devoted all their energy to increasing their acreage of wheat. But the other cereals—oats, rye, and barley—sown to supply local needs show a like abundant yield, and when brought to outside markets these products of northern soil will be found entitled to the high estimation accorded to the present staple.

"The larger yield to the acre, the better quality, and higher grade of crop, shown in this northern country, are matters lifted by the vast extent of the land above a question of individual profit to the persons now cultivating the soil. If one-half the ground of that comparatively

small portion which is drained by the Red River and its affluents were sown to wheat, the product at an average yield would be 500,000,000 bushels, or more than the entire amount raised in the United States in 1880.

"However uncertain may be effects on the United States, we may expect that the centre of activity in wheat, never very stable, will soon pass to the Red River Valley—to go later, possibly, still farther northward. Most valued by the farmers in Minnesota for seed is the grain coming from the Red River Valley, and especially that from Manitoba. Taken southward, if not renewed frequently from the original source, it tends to degenerate, and become soft. Harder and better still is the wheat coming from the region of the Upper Saskatchewan and the Peace River. This perfect grain has the greatest weight of all, and by cultivation even in the Red River Valley shows a loss of its original quality."

The Forest.

The value of the timber trade to Canada is well-known, and the forests of the Dominion are properly considered as one of the most important resources of the country. The absence of trees is undoubtedly caused by a deficiency of moisture, and the areas of summer droughts in the Old and New worlds are identical with the treeless areas. This climatic defect must operate permanently and with increased intensity upon plants.

It will be seen on reference to the accompanying map that, with the exception of the extreme arctic coast, and the comparatively small section of the American desert which crosses the international boundary, Canada is covered with forest trees.

The prairies of the North-West form the northern limits of the prairie lands, and being but park-like open-

ings in this vast forest region, have the rainfall and humidity which secure them rich crops of grasses and cereals.

North of the parallel of 49°, east of the Rocky Mountains, there are about 120,000 square miles of prairie, an area equal to Great Britain and Ireland. Between this and the North Saskatchewan the prairie land predominates, but is interspersed with groves. North of the Saskatchewan the forests predominate, there being not more than one-third prairie. Along the eastern base of the Rocky Mountains, and extending up into the recesses of the mountains, is a belt of conifers, the principal tree being the Douglas pine (the tree is, however, an *Abies*), and the white and black spruce. East of these mountains the watersheds are mostly covered with heavy forests of spruce, but the dry ground, where there are trees, with poplars (*Populus tremuloides*). In the damp forest lands near the mountains, balsam poplar is found in some abundance, and this is the species which grows to such an enormous size on the Athabasca, Peace, and Mackenzie Rivers,—all the islands in these rivers being covered with trees of this species, often 7 to 10 feet in diameter and 100 feet in height.

In the eastern parts of the territory the Banksian pine is a small tree seldom attaining 12 inches in diameter; but on the southern shores of Hudson Bay it is found 2 feet in diameter and 100 feet in height. Another small pine (*Pinus contorta*) ranges from the head of the Athabasca through the Rocky Mountains, and forms thick forests of many miles in extent in Upper British Columbia west and north of the Fraser River.

The forests of British Columbia west of the Cascade Mountains are very fine, and here the Douglas pine or Douglas spruce (*Abies Douglasii*) and giant cedar attain their greatest dimensions. East of the Cascades the forest clings about the mountain tops, but the trees are

much smaller. *Pinus ponderosa* is in some abundance on the Thompson River, and has much the appearance of red cedar. On the western slopes of the Rocky Mountains are many species of fir and pine, which, in the near future, can supply the eastern plains with enormous quantities of first-class timber.

The cone-bearing trees are found in a broad belt west of the Rocky Mountains, sweeping around the shores of the North Pacific and Arctic Seas, down the coast of Hudson Bay and Labrador and across the St. Lawrence, keeping in the cooler and more humid climates of the Pacific, Arctic, and Atlantic Oceans. These forests are also mixed with white birch and poplar.

In the interior of the continent, when the summer temperatures range from 60° to 80°, with somewhat uniform summer rains, are found the great mixed forests of North America, the most remarkable forests of deciduous and coniferous trees in the globe. These forests are made up of some sixty to seventy varieties of trees, birch being predominant, and forty to fifty of shrubs. The most valuable of these forests are in the Dominion of Canada.

In going northward from the United States boundary at the Lake of the Woods by way of Winnipeg River and Lake, the Nelson River and the sea-coast northward, Mr. Bell found the trees disappearing in the following order:—Grass wood, sugar maple, yellow birch, white oak, soft maple, gray elm, white and red pine, red oak, black ash, white cedar, serrated leaf poplar, mountain ash, balsam fir, white birch, Banksian pine, balm of Gilead, aspen, tamarack, white and black spruce. Black spruce is found some distance beyond Seal River, lat. 59°, long. 96°. Here Mr. Bell found black spruce 3 feet in diameter and 100 feet in height. Balsam poplar 6 to 10 feet in diameter is found on Red River, and very abundant

White spruce 3 feet in diameter is also found at Fort Simpson, lat. 62° 5′.[1]

Climates fatal to forest trees could not be favourable to fruit trees, nor indeed to any agricultural products. Hence the absence of orchards and the frequent failures of crops throughout the Western States from the deficiency of summer rains.

The high summer temperatures and abundant summer rains in Canada are unquestionably the conditions of climate necessary to produce these peculiar trees.

We take the sugar maple (*Acer saccharinum*) as our starting-point for illustration. This forest tree is found over the greater part of the valley of the St. Lawrence up to latitude 49°, in the Red River north of 49°, and the ash-leafed maple (*N. flaxinifolium*) on the Saskatchewan, lat. 54. It requires a summer of from 65° to 67°, and copious rains. The summer temperatures of England and the north of France are too low for this tree (London 61°, Liverpool 57°, Paris 64°). The British Islands have the necessary rain but not the heat; the western prairies have the heat but not the rain. This beautiful tree attains, in Canada, the height of 120 feet, and 12 in circumference. Besides the sugar maple, there are four other varieties, one especially (*A. dasycarpum*), nearly as large as the one described above.

Wherever the maple grows, the wild vine may be found running to the tops of ordinary forest trees, and in favourable localities sometimes attaining 6 inches in diameter. This may be taken as a rough estimate of the extent of country—twice the size of Great Britain in the valley of the St. Lawrence alone—in which the grape may be cultivated, for our vine-growers are getting hardier varieties, based on the native vine.

[1] J. Beaufort Hurlbert, M.A., LL.D., *Physical Atlas*, and *Climates, Productions, and Resources of Canada.*

The Canadian forests are made up of some sixty trees, with numerous shrubs. We name only a few. The black walnut (*Juglans nigra*), in the western and south-western parts of Canada, has an average height of 120 feet, and 70 to the first limb. Trunks 6 feet in diameter and 18 in circumference were not uncommon in the pristine forests. The chestnut (*Castanea vesca*) attains a height of 100 feet, and 3 in diameter; the butternut (*Juglans cinerea*) is also one of the largest forest trees, widely diffused over Canada, with 60 to 70 feet of trunk free from limbs. The gigantic oaks and elms are too well known to require description, and are found 18 and even 22 feet in circumference.

The climate that produces the plane-tree or button-wood (*Platanus occidentalis*), 60 inches in diameter and 60 feet to the first limb; the white-wood (*Liriodendron tulipifera*), a variety of the gorgeous magnolia, equal in height and size to the last-named; the pepperidge, or sour gum tree (*Nyssa multiflora*), 100 feet high; the flowering dog-wood (*Cornus florida*), 30 feet high and 8 inches in diameter; the red cedar (*Juniperus virginiana*), 24 inches in diameter; the sassafras (*S. officinale*), 60 feet high,—the climate that produces such forests, with a hundred varieties of trees and shrubs, needs no further defence with the botanist, nor even with those but partially acquainted with the productions of the earth and the localities where they grow. The writer, in 1862, made a very full collection of the woods and plants of Canada for the International Exhibition in London, with a view to correct the erroneous opinions so widely entertained as to our climate. Several eminent botanists, amongst others Sir William Hooker, Director of the Kew Gardens, and Mr. Lindley, made special reference to the collection, as illustrating this very subject. Samples of some sixty varieties of Canadian woods were presented to the Kew

Gardens, the British Museum, the Admiralty, to Lloyd's in London, the Industrial Museum of Edinburgh, and to the chief governments of Europe. These were highly prized as most irrefragable proofs of a high summer temperature, as well as for their commercial value.

The lumber trade, which for many years formed the largest item in Canadian exports, has felt most severely the general commercial depression of the past five or six years. The value of the total export of lumber for the fiscal year 1879 was only $13,261,459 against $19,511,575 in 1878, being a decrease of $6,250,116, or about 32 per cent; and as compared with the largest yearly export, 1873, when values aggregated $28,586,816, the falling off is considerably more serious, the difference being $15,325,357, or about 54 per cent, the decrease being larger than the entire export for the latter year. It should be noted that the decrease in these exports from 1873 to 1878 was almost entirely in the shipments to the United States, they amounting in the earlier year to $12,498,417, and in the latter year only to $4,481,053. The figures for the same years for Great Britain are nearly equal, being in 1873 $13,749,755, and in 1878 $13,271,372; but taking the figures for 1879 it will be seen that while the values of the exports to the United States show no material difference from 1878, those to Great Britain have declined from $13,271,372 in 1878 to $7,328,513 in 1879. It is satisfactory, however, to note that the supplementary returns of exports for the last six months of 1879 exhibit a slight improvement in those of lumber over the corresponding six months of 1878, the amounts respectively being $10,304,081 and $9,257,471. This indication that the trade is reviving is confirmed by reports from lumber dealers, that the close of 1879 and the opening of 1880 brought an improved demand, chiefly from the States, and that better

prices were being obtained, which have often ruled ruinously low during late years. In which connection it may be remarked that the heavy decline in the value of lumber exports, while mainly attributable to increased demand, has been aggravated by low prices.

The Grasses.

The region of the cultivated grasses (timothy and clover chiefly) is identical with that of the summer rains, roughly sketched in the temperate zone of this continent by the presence of forests; where these do not exist the cultivated turf cannot be produced, unless in the higher latitudes and in a humid atmosphere. Hence the vast areas of the Western States, even east of the Mississippi River, unfavourable for pastures, and of course for the dairy. West of that river, pastures of these grasses almost wholly fail. As a general rule the cultivated grasses fail south of latitude 39° east of the Mississippi, and at a much higher latitude west of it.

The great prairies have many peculiar species of grass of most tenacious hold until the turf is broken, but then almost incapable of reproduction, as they rarely produce seeds, and never spread from the root.

The prairie grasses make good pastures in their wild state, and grow where the timothy, clover, and even blue grasses will not; but when the land is brought under cultivation, the wild grasses cannot be reset in districts even partially deprived of summer rains.

In no part of the United States west of the Mississippi is there rain in the summer. In the north and north-west of New Mexico the rain is mostly in the winter, in the southern part of Texas and New Mexico it is in the autumn, and west of Arkansas in spring.

The flocks and herds, and dairy produce of the pas-

tures and meadows, have a value equal if not superior to the cereals. From the great and rapidly increasing demand for horses, beef, and mutton in the great centres of commerce and manufactures on both continents, and from the increasing facilities for transport, the pasture lands of Canada must assume in the near future an importance scarcely to be estimated.

The chief grazing region, the chief meadows and pastures in North America, the home of the herds, flocks, and the dairy, must be in the Dominion of Canada, embracing as it does the zones of summer rains, and lying in latitudes and positions similar to the western and central parts of Europe.

Taking as our guide the temperatures and rainfall, the existence of native grasses, and the analogy of Europe, we are justified in the inference that the cultivable grasses in the Dominion would extend over an area of more than 2,000,000 square miles, or more than 1,200,000,000 acres. Deducting such percentage of untillable lands as is usually found in countries—and Canada is made up chiefly of the vast plains of four great river valleys—there would still remain an almost boundless region the most favourable for pastures and meadows.

Fruit-Growing.

A very important branch of farming in certain parts of Canada is fruit-growing. It is very generally thought by persons not familiar with the country that, owing to the severity of the winter, fruits cannot be successfully cultivated except to a very limited extent, and at a great cost. There is no foundation in fact for such an impression. On the contrary, in the production of such kinds of fruit as belong to the temperate zone, Canada cannot well be surpassed. The character of the soil in

many districts is suitable for the apple, plum, pear, etc., while in the hot summer sun the peach and grape reach maturity and develop fruit having many points of excellence. A hardy kind of grape, which has been successfully crossed into the European varieties, grows wild in the woods; the strawberry, raspberry, and gooseberry, and other small fruits, grow in profusion in all the older provinces. The red plum is also indigenous to the soil.

In specially-favoured regions, such as the Niagara district, peach orchards many acres in extent are to be seen. The peach crop is not always a successful one; generally speaking, there is a good yield every second year. Though it is far from probable that Canada will ever rival European countries in the character of her wine, nevertheless her vineyards are increasing in number year by year, and good wholesome wines are being made. Experience is all that is necessary to develop this into an important industry.

The best evidence we could have of Canada's character as a fruit-growing country is furnished in her success in this direction at the Centennial Exhibition. The display made by the Province of Ontario was the finest at the show, surpassing all competition, which included nearly every State in the American Union, and astonishing persons who had looked upon Canada as a country of perpetual snow. The Americans honestly admitted themselves fairly beaten by their northern neighbours. The following extract from an article in the New York *Graphic* shows the prominence Canada gained in this respect. Coming from an American source, it carries with it special weight.

"Probably the finest show of various fruits is made by the Fruit Growers' Association of Ontario, Canada, a society which has done much to promote and encourage the cultivation of fruits in North America. It was

formed a number of years ago with this object in view, and has been extremely successful in all its undertakings. The membership includes more than 3000 persons. Three meetings are held every year, at which the members interchange their views upon the various subjects connected with fruit-growing. These meetings are held in different parts of the Province of Ontario, in order to be more convenient for members to attend; and once a year new and promising hybrids, trees, and plants are given to members, who are expected to cultivate them carefully, and report the results of their trials. A number of the members of this society have achieved a reputation as careful hybridists, and the names of Arnold, Dempsey, Mills, and Saunders are held in deserved estimation throughout the pomological world. The best results of their labours are generously placed at the disposal of the Association, and new and promising varieties of fruits are soon widely and inexpensively scattered abroad and thoroughly tested.

"The Society also publishes an annual report,—embodying its transactions, and preserving such useful information with regard to fruit culture as they may be able to gather,—and gives a copy of it to each of its members. In this manner many choice fruits and much useful information are disseminated among the members; hence it is that the fruits produced by them are generally noted for superiority and excellence.

"At the quarter-centennial of the American Pomological Society in Boston, the Ontario Fruit-Growers' Association carried away not only silver medals for the best collection of plums, but also prizes for the peaches, grapes, and pears displayed in competition with the most noted fruit-growers of the United States.

"The present display occupies the entire north side of the Pomological Building, and is composed of 1000

plates of apples, 200 plates of plums, 200 plates of pears, 90 plates of crab-apples, and 25 varieties of peaches, 153 plates of grapes, and a variety of nuts, including walnuts, butternuts, hickory nuts, hazelnuts, and peanuts. The same Association, in July last, made a display of gooseberries, currants, raspberries, and cherries, some of the first-named being an inch in length. They were highly commended by the judges, as no prize was competed for.

"One of the finest specimens of fruit exhibited is the Alexander, a beautiful clear red-and-white apple of large size. Another is the Kent Fillbasket, a large obtuse pyramid, beautifully mottled with red on a yellow ground. The Virginia Sweet is a showy red apple, rather oblong in shape, and of large size. The Irish Peach Apple is a great beauty, as well as of fine quality, while the Duchess of Edinburgh is a very hardy apple, mottle red in colour, and of handsome appearance. It is good either for the kitchen or table, and is highly esteemed by connoisseurs. Sherwood's Favourite is a fine yellow and red, and Swayzie Pomme Grise is a hardy cinnamon russet of beautiful colour. There are remarkably fine specimens of the Snow Apple, which is a bright red outside and a pure white inside, and takes its name from the latter characteristic. Spur's Sweeting is a fine showy apple of rosy waxen colour, and the Chenango Strawberry is a beautiful red apple of conical shape. Many other specimens are shown, among which are thirty-one varieties of new French apples exhibited by James Dougall of Windsor. All the foregoing specimens named are raised in large quantities in Canada, and thousands of barrels are annually exported to Great Britain and the United States. As a sample of the manner in which they will keep, a plate is shown of the growth of 1875, in which the apples are well preserved and of good appearance.

"One of the finest specimens of pears exhibited is the Flemish Beauty, which grows without a blemish, and is hardy as an oak; Sickles, Bartletts, Negleys, and the Belle Lucrative are also displayed in great quantities, of a quality that compares favourably with any others on exhibition.

"The plums displayed are remarkably fine, the most noticeable ones being the Columbia, Pond's Seedlings, Damsons, Gages, and the Lombard. The latter is a beautiful dark crimson, and is very prolific. Hundreds of bushels of these plums are sent every year to the United States, where they find a ready sale, and are greatly esteemed.

"In peaches the Lord Palmerston is doubtless the largest shown. One of these was displayed which was over eleven inches in circumference, the qualities being a firm white flesh, with free stone. The Early Crawfords and other varieties are also very fine.

"In grapes the Tokalon and many varieties of Rogers' hybrids are the most noticeable. The Autuchon, a beautiful white grape, and the Lindley, light-coloured, and resembling the Catawba, attract much attention. Miller's Burgundy, a grape which grows very close and thick, and the Delaware, a delicious variety, are also favourably known to fruit cultivators.

"These are but a few of the many specimens displayed. It would be impossible, in a notice like this, to do justice to the entire collection. As a representative collection, intended to exhibit the fruit from that section of the country between the Niagara River and Lake Huron, and from the Ottawa to the Detroit Rivers, it could not be surpassed. The arrangement and classification reflect much credit upon the officers of the Association, and especially upon the gentlemen who are in charge. It must be doubly gratifying to them that this very beau-

tiful display of the fruits of the Province attracts such universal attention. Their exhibit has contributed much to the beauty and attractiveness of the pomological department, and they are to be congratulated upon the fruit-producing capabilities of their soil and climate, and the taste and enterprise of their fruit-growers."

With such facts as are contained in the above extract, let it not hereafter be said that Canada is a wilderness of ice and snow.

CHAPTER VIII.

MINES AND MINERALS.

THOUGH the main sources of the wealth of Canada lie in her fertile fields, luxuriant pastures, grand forests, and inexhaustible fisheries, her mines and minerals must in course of time attract more attention than they have hitherto done, and yield a good return for the capital and labour expended on them. As the Canadians devote their attention chiefly to the more common pursuits of farming, lumbering, and ordinary trade, comparatively little has been done towards developing the mineral resources of the country; yet the results attained abundantly prove that there are vast and valuable deposits of coal, gold, iron, copper, lead, antimony, silver, manganese, plumbago, mica, asbestos, apatite, gypsum, salt, and petroleum. Except in Nova Scotia, and partially in British Columbia, the want of any system of collecting the mineral statistics of the Dominion makes it impossible to give accurate figures of the quantities and value of mining products. A few of the most trustworthy of these may, however, prove interesting.

British Columbia.—According to a table published by the Minister of Mines of this province, the total value of the gold extracted from 1858 to 1876, inclusive, was $39,953,618,—the annual average number of miners employed being estimated at 3220.

In the two years 1874 and 1875 the coal produced

from the only two mines then working on Vancouver Island was 194,545 tons, worth $6 per ton in Victoria, or $10 per ton in San Francisco, and representing a money value in Victoria of $1,167,270. The principal markets are Victoria and San Francisco, but small quantities are shipped to Honolulu, Mazatlan, Alaska, etc. Notwithstanding the heavy United States duties on foreign coal, the export from Vancouver to San Francisco has steadily increased from 6015 tons in 1862 to 101,572 tons in 1876. Since 1876 several new mines have been opened.

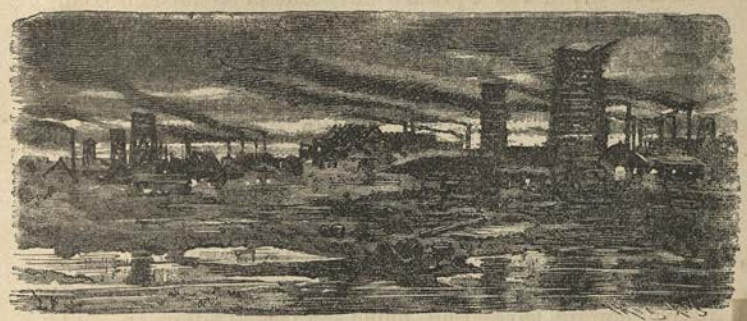
On Texada Island, in close proximity to the coal-mines, is a large deposit of magnetic iron ore, but no attempt has yet been made to work it.

Small veins of copper ore have been noticed in several localities, while fragments of rich ore and of native copper have been found on the Thompson and Fraser rivers. Rich ores of silver and argentiferous galena have been found in several places, and in the Omineca gold-fields and on the Similkameen River grains and small nuggets of native silver occur with the gold drifts. More or less fine platinum has been found with alluvial gold in several of the streams of British Columbia, particularly in the Similkameen River.

Ontario.—The most important mineral products of this province are petroleum, salt, gypsum or "plaster," silver, copper, iron, and phosphate.

At present there are about 350 wells capable of producing petroleum. At one time about 500 small steam-engines for boring and pumping were on the ground. The oil-wells in Ontario have all been bored by the ordinary percussion drill. A small proportion of the oil is distilled at Petrolia, but the greater part is refined in London, about fifty miles to the eastward. Here there are fifteen refineries of a total capacity of

12,000 to 15,000 barrels per week, the principal one being the Atlantic Petroleum Works. The total value of the plant, etc., employed in the production of the oil is estimated at about $750,000, and of that used in the refining processes at about $550,000. Wages are $2.50 per day for drillers, $2.00 for mechanics, and $1.25 for



PETROLIA.

labourers. The following are the quantities refined in Ontario for the five years from 1871 to 1875 :—

Year ending 30th June	1871	.	269,395	barrels of 40 gals.
" "	1872	.	308,100	" "
" "	1873	.	365,052	" "
" "	1874	.	168,807	" "
" "	1875 (about)		210,000	" "

Latterly, the greater part of the oil has been consumed within the Dominion, only a comparatively small proportion being exported.

Salt.—From the Report of the Geological Survey 1874-75, we learn that in 1874 the capital invested in the salt interest in Ontario was $624,000, the value of plant and works being $571,838. The total production of fine salt in 1873 was 438,076 barrels, and of coarse salt 13,500 barrels, valued at $436,218; of which 226,576 barrels were sold in the Dominion and 225,000 barrels

in the United States. There were also manufactured about 3040 tons of land salt, valued at $8360.

Gypsum.—From 1869 to 1871 the quantity of gypsum mined in Ontario was about 5000 tons a year, valued at $4 per ton. In 1876 the Ontario gypsum mines were producing about 14,500 tons per annum.

The gypsum or "plaster" deposits of Ontario belong to the Onondaga formation, which is extensively developed in Northern New York, crosses the Niagara River into Canada, and extends north-westward to Lake Huron, a distance of 150 miles, again appearing at the Straits of Mackinac between Lake Huron and Lake Michigan. It not only affords gypsum, but is also the source of valuable brine springs, and includes magnesian limestones, which are often suitable for the manufacture of hydraulic cement. The principal gypsum mines worked are along the Grand River, between Cayuga and Paris, a distance of 35 miles. Dolomite is found immediately above and below the gypsum, and is sometimes interstratified in thin beds with it. That above is often arched, forming domes or mounds at the surface indicative of gypsum beneath.

Silver.—The production of silver ore from the Thunder Bay and Silver Islet mines, Lake Superior, for the three years from 1869 to 1871, was 1,156,364 lbs., —value at the mine, $823,077.

The Silver Islet Mine is stated to have yielded, from 1871 to 1876, a total of $2,500,000 worth of silver at a cost of $1,500,000. It has since then been continuously and actively worked with profitable results, and several other mines have been opened on the mainland and on the adjacent islands.

Copper.—The West Canadian mines on Lake Huron are the only copper mines in Ontario that have been worked continuously from 1847 to the present time.

These mines are situated on the Bruce, Wellington, and Huron Copper Bay Locations, which adjoin one another, the Bruce being the most easterly. Work was begun on the last named in 1846, and has since been gradually extended westward, across the Wellington and on to the Huron Copper Bay, the whole length of the workings comprising nearly four miles. The present company purchased the Wellington Location from the Montreal Mining Company (who had previously worked the Bruce Mines from the time of their discovery in 1846) in 1853, and the Bruce Location in 1864, and they hold a renewable lease, obtained in 1858, of the Huron Copper Bay Location. For a time some of the produce of the mine was sent to Baltimore, but the great bulk of it has gone to England, which is the present market. The total amount of the sales of the copper ore and copper up to 1875 has been about $3,300,000, and this has afforded a good average profit.

Iron Ore.—The iron ores of Ontario belong to the Laurentian and Huronian systems, and are associated with gneiss and crystalline limestone. They correspond with the ores which occur in the same systems in Northern New York and in the highlands of Southern New York and New Jersey, where they have long been mined on an extensive scale. The Swedish iron, which is famous throughout the markets of the world, is made from similar ores, which occur there in rocks of the same age. The ore is chiefly magnetic oxide, but often mixed with hematite, and contains from 50 to 64 per cent of metallic iron. The beds or veins vary in thickness from 1 foot to 200 feet, and there is practically no limit to the quantity of these ores which could be mined. Of the actual production there are no recent statistics; but in the years from 1869 to 1871, 65,440 tons were raised, of the value of $163,600. Since then the

quantity mined has gradually increased. The cost of mining is about $1.50 per ton. None of the ore is at present smelted in the country, the whole of it being exported to Cleveland and other points in the United States.

Phosphate of lime or apatite in both beds and veins is very common in the Laurentian rocks of Canada, and has been mined on a small scale for some years. It is generally found in pyroxenic or garnetiferous gneiss, or in crystalline limestone; and deposits several feet in thickness, and almost entirely free from foreign minerals, are of frequent occurrence. The best known deposits in Ontario are in the townships of North and South Burgess and North Elmsley; but important localities have also been discovered in Ottawa County, Quebec.

The production of this mineral in Canada is now assuming very large proportions. It was first mined in Ontario in 1863, and up to 1876 about 12,000 or 15,000 tons had been mined. The price has varied from $16 to $22 per ton for mineral containing 74 to 85 per cent of phosphate of lime. Very beautiful and perfect hexagonal crystals of apatite are frequently found in the workings, sometimes exceeding 2 feet in length with faces 6 inches broad. As much as $100 has been paid for one of these large crystals, while the smaller ones command correspondingly high prices, both in the United States and in Europe.

Quebec.—Ores of copper and iron, gold, roofing slate, phosphate of lime, and asbestos, are the leading mining products in this province.

Since 1871 a number of valuable mines of phosphate and asbestos have been discovered and worked with satisfactory results, while the production of most of the other minerals has considerably increased.

New Brunswick.—Iron ore, coal, manganese, gypsum,

and building stone are found in this province, and also the mineral albertite, which differs from true coal in being of one quality throughout, in containing no traces of vegetable tissues, and in its mode of occurrence, as a *vein*, and not as a bed. The vein occupies an irregular and nearly vertical fissure, and varies from 1 inch to 17 feet in thickness. It has been mined to a depth of 1162 feet.

Since the first discovery of the Albert Mines the amount of the mineral exported, chiefly to the United States, during the twelve years from 1863 to 1874 has been 154,800 tons.

It has been used partly for the manufacture of oil, and partly for admixture with ordinary bituminous coals in the preparation of illuminating gas. For either of these purposes it is admirably adapted, yielding 100 gallons of crude oil, or 14,500 cubic feet of gas of superior illuminating power per ton. When employed with coal it leaves as a residuum a valuable coke.

The vein is now exhausted, and the works suspended, but it seems probable that other similar veins may be discovered in the vicinity if properly sought for.

Besides the minerals above named, plumbago and antimony ore have both been mined in New Brunswick at intervals, and with varying success.

The veins holding stibnite, or gray sulphide of antimony, at Prince William, seem to have been known for a number of years without attracting much attention until about the year 1862, when fresh discoveries having been made indicating a considerable body of ore, several companies were formed with a view to its development. Through their explorations the mineral was found to be more or less abundantly spread over an area of several square miles, occurring chiefly in veins of white quartz or of quartz and calc-spar, intersecting hard clay slates and

sandstones of undetermined age. These veins vary in thickness from a few inches to 6 feet, the ore being irregularly distributed through the quartz in strings or veinlets, sometimes attaining a thickness of from 12 to 15 inches. A large portion of that hitherto raised has been obtained within a short distance of the surface by means of trenches dug on the course of the lodes, but several shafts have also been sunk to a depth of over 100 feet. The value of the metal on the ground is 12 to 14 cents per pound. It is partly exported in cakes or ingots to the United States, and partly employed on the ground in the manufacture of Babbit metal (containing 15 to 20 per cent of antimony with lead and tin, or in the better qualities with lead, copper, and tin), valued at from 20 to 50 cents per pound.

Nova Scotia.—In the variety and value of its mineral resources this province stands pre-eminent, and it is the only one in which carefully compiled mineral statistics are annually published by the Government.

From the Report of the Mining Department for 1880 we learn that the total value of the mineral productions of that year, which included gold, manganese, coal, gypsum, and building stone, amounted to about 3½ millions of dollars.

Besides the foregoing, copper, petroleum, and salt are likely soon to be added to the minerals produced in this province.

As regards petroleum, the Inspector of Mines states: "During 1879 and 1880 large tracts of land in Victoria and Inverness counties, Cape Breton Island, were carefully examined, and the following indications of the presence of petroleum observed:—Globules of heavy dark petroleum were seen rising through the water of Lake Ainslie, and spreading over the surface, so that the rocks on the shores were in many places saturated with it, and

this saturation was observed for several miles. Swamps were frequently found to be covered with oil, and many springs were so impregnated with it as to be unfit for domestic use. Gas was also observed issuing from fissures in the rocks in many places.

"Seven wells have been sunk in the Lake Ainslie district. That of the Cape Breton Oil and Mining Company has reached a depth of 1100 feet. Considerable quantities of oil have been secured. At present the quantity of salt water in the strata has caused a delay, and necessitated fresh pumping appliances."

It would be instructive could we compare the quantities produced during the three years from 1879 to 1881, but there are no statistics available, except for Nova Scotia. In this case we find from the figures above given that the yield for 1880 is very nearly double that of the average of the three years 1869 to 1870.

Assuming a similar development to have occurred in the other provinces, the total annual value of minerals raised in the Dominion would now be considerably over eight million dollars, of which the provinces of British Columbia and Nova Scotia yield more than two-thirds. This arises from their productive coal and gold mines. The former, however, are destined in the near future to be surpassed in productiveness by the vast coal-fields of the territories east of the Rocky Mountains, but in which as yet no mines have been established.

CHAPTER IX.

CANALS AND RAILWAYS—POSTAL SYSTEM, TELEGRAPHS, ETC.

THE canals of Canada are among its most important public works, and are evidence of the energy and determination of the people to provide facilities not only for their own internal communication, but also such as will eventually control the carrying trade of the whole south-west of the American continent.

Their cost is stated by Sir Alexander Galt at $37,500,000, and by P. Forten, who includes incidental works, at $60,000,000.

These canals are too numerous to admit of a detailed description. As engineering works, they are the pride of Canada; but they are remarkable for their capacity rather than for their length, and are invaluable as forming a communication with the great lakes. Vessels of considerable tonnage pass through these to the interior of the country. Ships of 4500 tons burden, for example, can enter the harbour of Montreal through a canal unsurpassed in magnitude by any other canal works, excepting those on the Clyde; and it is this system which renders navigation practicable from the strait of Belle Isle, by the river St. Lawrence, through Lakes Ontario, Erie, St. Clair, and Huron to Duluth at the head of Lake Superior, a distance of 2384 statute miles.

The total length of canal and river improvement

embraces about 250 miles upon the St. Lawrence, Ottawa, Rideau, and Richelieu rivers.

The canal systems of the Dominion, under Government control, are as follows:—

1. The river St. Lawrence and Lakes.
2. The river Ottawa.
3. The Rideau Navigation from Ottawa.
4. The Trent Navigation to Kingston.
5. The river Richelieu to Lake Champlain.
6. St. Peter Canal, Cape Breton, Nova Scotia.

Among canals projected is one to connect the Bay of Fundy with the Gulf of St. Lawrence, and another to connect the St. Lawrence with Lake Huron, as follows:—

1. The Ottawa and Georgian Bay Canal, from Montreal, *viâ* the Ottawa and Lake Nipissing, to French River.

2. The Toronto and Georgian Bay Canal, by way of Lake Simcoe.

3. The Hur-Ontario Canal, from Hamilton to Lake Huron, near Port Franks.

The competitor with the St. Lawrence system of canals for the western trade is the Erie Canal, between the foot of Lake Erie and New York.

The works for the enlargement of the canal, commenced in 1871, comprise the construction of locks 200 feet long and 45 feet wide, with 9 feet of water on the sills; the main channel having a depth of 10 feet and a mean width at bottom of 40 feet, varying at the surface from 50 to 80 feet.

Canada has faith in her canal system, and expects that when she has reduced the cost of inland carriage to a minimum, European and American capital will avail itself of the shortest and cheapest route from the Atlantic to the interior of the North American continent. The distance from Chicago to Liverpool *viâ* Montreal is 300 miles

shorter than *viâ* New York. The difference in time in favour of the lake and river route against the Erie Canal is seven to eight days. The Erie Canal is closed by frost several days earlier than the St. Lawrence canals, and the cost of transport by the latter is considerably less. For transatlantic trade the canals of Canada offer a communication with the great lakes, the inland portion of which is superior to that *viâ* New York; but the sea portion of the route is inferior in rates of freight and insurance.

By this system of canals, vessels of 4500 tons can enter the harbour of Montreal, and propellers of 1500 tons can pass thence to the head of Lake Superior.

The tolls on these canals are almost nominal, intended simply to defray the cost of maintenance, and the policy of the Government is, as far as possible, to make them free, and thus through the increased traffic to secure an indirect profit to the country.

1. *Railways.*

Canada owes her first railway, as well as her first steamboat, to Montreal.

In 1831, on the announcement of the success of the Liverpool and Manchester Railway, a charter was sought from the Parliament of Canada, and was granted in the following year, for a short line of railway between La-prairie, on the south bank of the St. Lawrence, nearly opposite to Montreal, to St. John's, on the Richelieu River, at the outlet of Lake Champlain. Work was commenced in 1835. In the following year the line was used with horse-power, and in 1837 with locomotives. It may be here remarked that one of the engines first used on this road was the handiwork of the celebrated Robert Stephenson, and this engine is still in use on a branch of the line

A RAILWAY MAP OF THE HEARTLAND OF CANADA AND OF THE NORTHERN PART OF THE UNITED STATES

London: Edward Stanford, 26 Charing Cross

between Quebec and Montreal, on the north shore of the St. Lawrence.

The first railway in Ontario was built between Queenston and Chippewa, on the Niagara River. It was opened as a horse railway in 1839.

The progress in railway construction has been as follows:—

1850	38 miles
1855	1218 „
1860	2173 „
1865	2231 „
1870	2679 „
1875	4899 „
1878	5700 „
1881	6981 „

According to the statement of the Minister of Railways, there are at present—

Railways in operation	6981 miles
Do. under construction (with track laid)	338 „
Do. do. do.	1077 „
Total	8396 „

and this mileage is being increased with great rapidity not only in the older provinces, but also in the North-West Territories. The total contributions paid and voted to railways in Canada is estimated at not less than one hundred millions of dollars. An idea of the rapidity of construction may be realised when it is stated that on the Canadian Pacific, or great transcontinental road, an average of two miles of track is laid daily at the end of each line; the materials of construction, accompanied by the engineers and navvies, with the commissariat, advancing in the construction carriages in regular succession, and proceeding on the road bed as it is laid.

Reference is made to the accompanying map as showing the extent and location of Canadian railways in 1882

between the Atlantic Ocean and Manitoba, and the connections with the United States lines.

This map, however, fails to show all the projected lines, and it is necessary to explain that the rapid development of the North-West has stimulated an effort on the part of the American companies to secure the anticipated profits by visitors from the west along the south shore of Lake Superior; whilst Canada is building her lines along the north shore of the same lake, and preparing to tap the American system at the Sault St. Marie, on Lake Superior, and thence through Ontario to connect with the St. Lawrence navigation or the Atlantic lines.

It is necessary to grasp this idea to realise the present struggle in railway construction between the United States and Canada for the traffic of the North-West, as well as for transcontinental transport. Each is striving to its utmost to utilise its geographical position, and to take advantage of both land and water routes.

The railway is a competitor with the waterway, but each has special advantages. As a rule the one is a supplement to the other, and the increased facilities for the transport of passengers and mails by the former, and of produce and heavy merchandise by the latter, induce an increase of business which benefits both.

Canada has just completed an extensive system of inland navigation by canals, as adjuncts to her rivers and lakes, and she is now busily engaged in making her railway system equally complete. The small returns of some of the railways already constructed might discourage any further extension, except on the main routes of travel; but the incidental advantages to agriculture and commerce in the opening and settlement of the country, and the anticipations of future traffic, fully justify the course adopted.

As has been fully established in the United States,

the railway is the pioneer to the settler, and introduces civilisation to the wilderness.

The following list of some of the first railways, in the order of their construction, is here given.

1. *The Great Western Railway* (commenced in 1853). —This line was built to connect the New York Central Railroad with the Michigan and Illinois lines over Canadian soil, and has always much sought after the through traffic from Chicago to New York.

The Great Western connects at Detroit with the Michigan lines, and has magnificent ferry steamers there which carry a whole train at a time across the river. It connects with the New York Central at Clifton, by means of a suspension railway bridge across the Niagara — a structure which is as great a triumph of engineering art as the Victoria Bridge itself. It connects with the Grand Trunk, principally by means of a branch from Hamilton to Toronto, also by a branch from Harrisburg, through Galt, to Guelph. Another important branch runs from Komoka to Sarnia, on Lake Huron, where and at Hamilton the company owns fine grain stores and elevators. A short line has also been opened to the oil regions at Petrolia.

2. *The Grand Trunk Railway* (commenced in 1856). —If the Great Western was originally built to carry western traffic to the Atlantic at New York, the Grand Trunk Railway was built for the opposite purpose of carrying it as far as possible through Canada, and delivering it at the seaboard at Montreal, Quebec, Portland, or if necessary, even Boston. The accommodation and development of the local traffic of Canada was also a leading idea of the projectors of this line.

The fusion of these lines into one great company has just been effected, and great results are confidently anticipated; but it is much to be regretted that at the building of the Grand Trunk the Great Western was not amal-

gamated with it as was at first intended, and made its western section. The misunderstanding which then occurred has had grievous consequences; the railways which should have been friends have always been rivals, to the detriment of their shareholders, and thus ultimately to that of the Dominion as well. The Grand Trunk Railway owns a branch from Detroit to Port Huron, opposite Sarnia, so that it competes at Detroit with other lines for the traffic of the West. It has fine ferry steamers at Sarnia, and an unbroken line from this place to Quebec on the St. Lawrence, and to Portland on the Atlantic. The line crosses the St. Lawrence at Montreal by means of the Victoria Bridge, and bifurcates at Richmond. The Grand Trunk has recently acquired control over the Buffalo and Lake Huron Railway, from Goderich to Buffalo, where it has ferry boats connecting with the New York railways. Also over the Montreal and Champlain Railway, which gives it an alternative route to Boston and New York. It has branches from St. Mary's to London, and from Arthabaska to Doucet's Landing, opposite Three Rivers.

3. *The London and Port Stanley Railway.*—This line was built to afford to the City of London, and the rich agricultural country around it, an outlet to Lake Erie. From Port Stanley, its lake terminus, Buffalo, Cleveland, Erie, Dunkirk, etc., are easily accessible.

4. *The Welland Railway.*—The Welland Railway is one of a class of railways peculiar to Canada, viz. grain portage roads, which are called for in consequence of the break in lake navigation caused by the Niagara Falls. The Hon. W. H. Merritt's name will always be associated with the Welland Railway. After having brought about the construction of the Welland Canal, to pass vessels between Lakes Erie and Ontario, he perceived that the cargoes of vessels too large to go through the canal would call for railway accommodation, which would be all the

more used, because grain is benefited by being aired in transferring it by means of elevators from the hold of a vessel to the railway, and again to another vessel. This traffic is what the Welland Railway was designed to do. The Niagara and Erie Railway, from Buffalo to Niagara, is another of the same class. The Hamilton and Port Dover Railway is another; so is the Northern Railway; and so, in a measure, is the Sarnia branch of the Great Western.

5. *The Nova Scotia Railway* extends from Halifax to Pictou, on the Gulf of St. Lawrence, 145 miles, with a branch line from Halifax to Windsor, on the Bay of Mines.

6. *The New Brunswick and Canada Railway* extends from St. Andrews on the sea-coast to Richmond, 88 miles, with branch lines to St. Stephen, Woodstock, and Houlton.

7. *The European and North American Railway* connects St. John on the Bay of Fundy with Shediac on the Gulf of St. Lawrence.

8. *The Western Extension* is a branch of this railway westward from St. John to the Maine boundary, 90 miles in length. This line is now completed on the American side of the boundary to Bangor, Maine, giving a through line from the United States railways to those of the maritime provinces.

9. *The Northern Railway* was built to enable the traffic of the upper lakes to pass from Lake Huron to Lake Ontario by railway from Collingwood to Toronto, and *vice versâ*; also to afford an outlet to the front for the country through which the road runs. To secure the Western traffic it heavily subsidised steamboats to and from Lake Michigan ports, and so involved itself in pecuniary difficulties; but recently, under the able management of the late Mr. Cumberland, who sedulously cultivated the local traffic, it has retrieved its position.

10. *The Canada Southern Railway* extends from the Niagara River at Fort Erie to Amherstburg, on the Detroit River, and Moore on the St. Clair River. The distance to Amherstburg is 229 miles, and the branch line to Moore 60 miles. It connects with the Michigan railways on the west, and the New York on the east, and is shorter by some 40 miles than any other route from Buffalo to Chicago.

11. *The Quebec, Montreal, Ottawa, and Occidental Railway*, from Quebec to Montreal, by the north shore of the St. Lawrence, and thence along the north shore of the Ottawa River to Hull.

To this necessarily imperfect list of existing lines might be added a larger number of projected railways, of great importance to the country, some of which are now under construction, but a want of space obliges us to confine our description to the railways which constitute the main trunk lines and through routes.

12. The Intercolonial road is a continuous line between Quebec and Halifax, following the south shore of the St. Lawrence a short distance below Rimouski, and thence crossing New Brunswick to the Nova Scotian peninsula as shown in the preceding map.

13. *The Canadian Pacific Railway* now to be mentioned will add immensely to the railway mileage of the country.

By this railway it is intended to form a connection with the present system of railways, in the Ottawa Valley, passing westward along the north shore of Lake Superior, reaching and crossing the Province of Manitoba, then sweeping over the great Saskatchewan plain, gaining the passes of the Rocky Mountains, crossing British Columbia, and landing on the shores of the Pacific Ocean at Burrard Inlet.

This railway, with its branches, may be considered

as the great colonisation road of Canada, as well as one of the most important highways across the continent.

Although it was early foreseen that the extension of the Canadian jurisdiction over the vast territories occupied by the Hudson Bay Company would enforce the construction of a transcontinental railway, it was not until 1871, when British Columbia became a member of the Canadian Confederacy, that the great undertaking was determined upon.

A survey was then commenced by the Government, and has been continued to the present time. This has involved the exploration of 46,000 miles (of which 11,500 have been measured), the expenditure of seven years of time, $3,000,000 of money, and the loss of some thirty-four lives. The estimated cost of the entire work ranges from 100 to 120 millions of dollars.

Between Lake Superior and the Rocky Mountains the line will form an outlet to a territory estimated to contain 160 millions of acres of land available for farming purposes, one half of which is arable; a great part of this 80,000,000 acres is not exceeded in fertility by any part of the world.

In 1878 the Government, having taken advantage of the reviving commercial prosperity of the times, and the confidence of the people in what is known as Canada's "national policy," made a contract with an enterprising and strong syndicate of European and Canadian capitalists, to build this missing link in the railway line between the two oceans on British territory. This contract is under the Dominion Act, cap. 1, 44 Victoria, 1881.

The route is indicated on the accompanying map, to which reference is made; under the clause, however, which empowers the company to vary the direction between the extreme points, subject to the approval of the Governor in council, considerable variation from the course indicated will probably be made.

The line is classed under four sections.

The Eastern extends from the terminus of the Canada Central Railway, near the east end of Lake Nipissing, westward towards the head of Lake Superior, about 650 miles.

The Lake Superior section, from Lake Superior to Selkirk on the Red River, about 406 miles.

The Central, from Selkirk, in the province of Manitoba, to Kamloops on the western slope of the Rocky Mountains, about 1350 miles.

The Western, from Kamloops to Port Moody on Burrard Inlet, about 212 miles.

The entire length of the line, from Lake Nipissing to Port Moody on the Pacific Ocean, will be about 2620 miles. The company's section is about 1932 miles. The remainder is to be completed by the Government.

According to the terms of the contract, the entire line is to be completed by 1st May 1891,[1] while the Government undertake to complete the western section by the 30th June 1885.

It is as well to note the connections this railway is forming to the east of Lake Nipissing.

The Canada Central follows the south shore of the Ottawa from Lake Nipissing, and connects, near the capital, with the "Quebec, Montreal, Ottawa, and Occidental Railway," which continues to Quebec and branches to Montreal. Here the St. Lawrence River has to be crossed.

The St. Lawrence River constitutes a serious barrier in the railway route between the east and west. It is overcome in the Niagara River at Buffalo, and again at Niagara, by suspension bridges. These bridges afford a connection in the western part of Canada with the Ameri-

[1] The president of the company has recently stated that the whole road will be completed in five years instead of ten.

can system of railways. In Eastern Canada the only connection is by the Victoria Bridge, under the control of the Grand Trunk Railway Company. In order to afford further railway facilities, a bridge is projected across the St. Lawrence at Morrisburg in connection with the Ottawa, Wadington, and New York Railway, and a further connection, by a new bridge, across the St. Lawrence at the Lachine Rapids just above Montreal, which is to be commenced immediately by the "Atlantic and North-Western Railway Company," a strong organisation intimately allied to the Canadian Pacific Railway in its management and interests. This "North-Western Railway" is now engaged in vigorously completing its surveys and preliminary arrangements to open a free connection for the Canadian Pacific Railway south of the St. Lawrence, and unite with the Atlantic system of railways independently of the Grand Trunk Railway and the Victoria Bridge.

14. The next railway to be mentioned is that proposed to be built, and now under survey, between Hudson Bay and Winnipeg, thereby opening a new route from Europe to the interior of North America, and shortening the distance, as compared with the Quebec route, about 1500 miles, or, *viâ* New York, about 2000 miles. This scheme has taken even the Canadians by surprise.

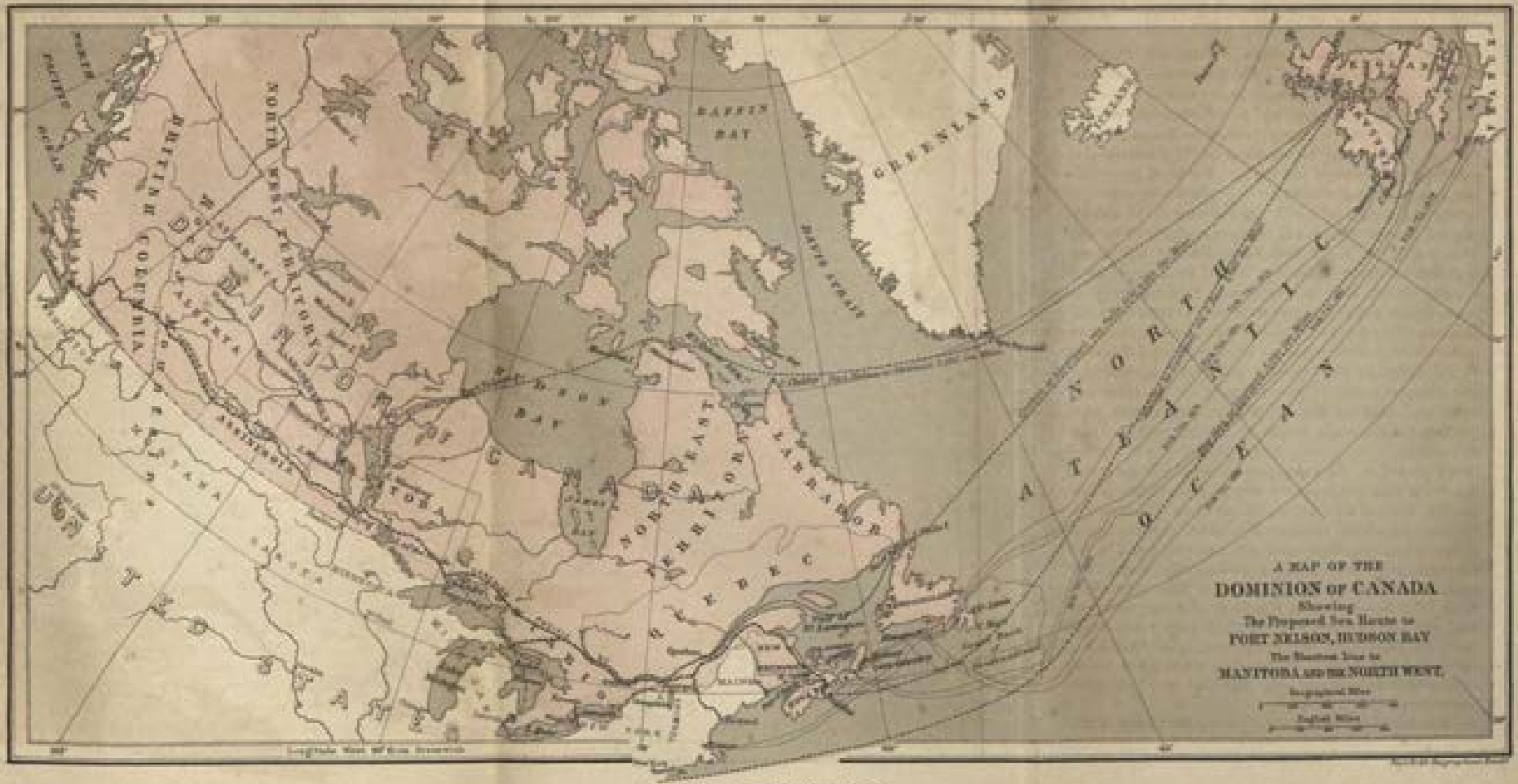
Why, it may be asked, has this route remained so long unused and ignored? The answer is, For the same reasons which have until now kept the fertile lands of the North-West unsettled and imperfectly known. The Hudson Bay Company have, until lately, held the whole of the North-West as a hunting ground for its Indians, and the interest of that Company lay in discouraging settlement or intrusion on its domain. As a consequence, it has been the universal belief that the territory was

sterile and the climate arctic in its character: these are now proved to be delusions. The navigation of Hudson Bay has hitherto been confined to the regular traders of the Hudson Bay Company, and to the American whalers, both of whom had a strong interest in magnifying its dangers. Its opening to commerce could not have preceded the settlement of the country, but there are excellent reasons for believing it entirely practicable now.

In the spring of 1880 the Parliament of Canada granted a very liberal and comprehensive charter (43 Vict. cap. 57) to the Nelson Valley Railway and Transportation Company, which was formed for the purpose of opening up the Hudson Bay route. This charter gives the company power to construct a railway from Churchill Harbour to the foot of Lake Winnipeg, with a branch or continuation south-westward to connect with the Canadian Pacific Railway; also power to construct telegraph lines and common roads, to run steamers on the lakes and rivers and ships on the sea, together with various other privileges. The whole length of the line will be about 350 miles.

A glance at the accompanying map will show that the route from Liverpool, by way of Hudson Bay, is by far the shortest one to the North-West Territories of Canada. Churchill Harbour is situated near the centre of the North American continent, and yet, owing to the convergence of the meridians towards the north, it is actually nearer to Liverpool than either Montreal or New York. The distance from Churchill Harbour to Liverpool, *vid* Hudson Strait, is about 2926 miles; from Montreal, *vid* Cape Race, it is 2990, and from New York, *vid* Cape Clear, 3040 miles, showing 64 miles in favour of Churchill as compared with Montreal, and 114 miles as compared with New York.

The fact of a seaport existing in the very heart of the



London: Edward Stanford, 55 Charing Cross.

continent, more than 1500 miles nearer than Quebec to the centre of the North-West Territory, has scarcely begun to be realised by the public; yet its importance can hardly be overrated. Churchill Harbour is only 400 miles from the edge of the greatest wheat-field in the world, or not so far as from Quebec to Toronto. The lands of the North-West capable of supporting an agricultural population exceed 200,000,000 of acres. An available seaport which will, as it were, bring this enormous tract so much nearer the markets of the world, may become the means of developing it in a way which cannot be accomplished by long railway lines.

The distance from the central part of the agricultural lands of the North-West Territories, say from a point between the North Saskatchewan and the Peace River to Churchill Harbour, is about the same as to the city of Winnipeg. Now, as the sea voyage from the former to Liverpool is rather shorter than from Montreal to Liverpool, it follows that, by adopting the Hudson Bay route, the whole distance from Winnipeg to Montreal is saved. By way of Lake Superior this amounts to 1291 miles, and by way of Chicago to 1698 miles.

For immigrants to the Canadian North-West this route presents advantages offered by no other. To say nothing of the saving in time and money, it is really the most independent route to these territories which Canada possesses. The original colonists and traders of Manitoba came this way, and it has been found throughout America that the course of trade and travel pointed out by nature, and first adopted by the pioneers, is sure to become eventually the great highway of the region.

By the proposed route immigrants from Europe may reach their destination on the Saskatchewan or Peace River almost as soon and as cheaply as they could reach Western Ontario *viâ* Quebec, and much more cheaply and

expeditiously than they could arrive in the Western States *vid* New York.

2. *Postal Systems.*

The postal system of Canada extends to every village and hamlet in the land, no matter how remote from the centres of business and population. The rate of postage is 3 cents per half ounce prepaid. The number of letters carried in a year between Canada and the United Kingdom is over two millions; newspapers and books number about the same. The ocean postage is 5 cents (2½d. sterling) per half ounce prepaid. The average passage of the mail steamers is about nine days. Postal cards can be sent between Great Britain and Canada for 2 cents (1d., sterling).

Canada was admitted into the International Postal Union on the 1st July 1878.

The money-order system in operation is similar to that of England. The money-order offices in Canada issue orders payable at money-order offices in the United Kingdom, and *vice versâ*, for any amount up to ten pounds sterling, and grant as many orders under and up to that sum as the applicant may require.

The offices in connection with the Post Office at which deposits may be made number 294. The amount standing to the credit of depositors on 30th June 1881 was $6,208,226.77. This represents part of the savings of the working classes, belonging, as it does, chiefly to mechanics and working servants. While on deposit the money bears interest at the rate of four per cent per annum, and it can be withdrawn at any time without notice.

3. *Telegraphs.*

The older provinces of Canada are served chiefly by

two Canadian companies, the larger of which, the Montreal Telegraph Company, was the first to introduce into America the system of a uniform rate irrespective of distance, and was also the first telegraph company organised in Canada. It commenced operations in 1847 with 540 miles of wire and $60,000 capital. It has now 21,568 miles of wire, 1674 offices for the transmission of messages, and a capital of $2,000,000.

The Dominion Telegraph Company has 13,051 miles of wire, and 600 offices for the transmission of messages. The Western Union and Anglo-American own respectively 5100 and 200 miles of wire, and 147 and 25 offices. The telegraph system in British Columbia is now owned and worked by the Dominion Government. It embraces 676½ miles of wire, 25 stations, and 26 miles of cable. The cost of maintaining this system is nearly $10,000 in excess of the revenue derived from it. In Manitoba and the North-West there are about 1200 miles of wire and 30 offices, and the line is being rapidly built westward to connect with the British Columbia system. 45,000 miles of wire and 2550 offices are given as the totals of the telegraph systems in operation in Canada.

The progress of telegraphy in Canada has thus been rapid. With it is associated the telephone, which is used in the larger cities.

The connection of the submarine with the overland telegraph systems may be considered complete, and the highly perfected Gulf of St. Lawrence telegraph and electric light stations recently constructed will make this main gate of the Atlantic as easy to traverse as an inland canal. The indefatigable friend of the sailor, the Hon. Pierre Fortin, is also urging on the Government the use of the heaviest guns as substitutes for fog-signals. There can be no doubt that the danger which has hitherto attended

the navigation of the Gulf and River St. Lawrence will be in large measure averted by the telegraphic system which now connects the islands with the mainland.

"It has been estimated that $1,500,000 are paid annually as premiums for insurance on vessels and their cargoes entering and leaving the St. Lawrence. With the improved submarine telegraphic system it will be safe to say that the rate of insurance will be reduced at least 25 per cent. Such being the case, a saving of $375,000 will in one year be effected, to say nothing of the many other advantages which will follow. Although the cost of construction and the future maintenance of the system must be borne by the Dominion Government, the benefits will be shared by the shipping of the world.

"Another and very important feature of Dr. Fortin's telegraphic system is its application to the interests of the fisheries. Along the southern shore of the St. Lawrence, between Cap de Chatte and Paspebiac, there will be thirty fishing stations established, each being connected with the coast telegraph line of the Montreal Telegraph Company. It will be the duty of the officer in charge of the station to collect each day information regarding the state of the fisheries, whether there appears to be any fish in the neighbourhood of his station, whether the supply of bait is good or poor, the state of the weather, and in fact all information that would be of service to those employed in the fisheries. This information he telegraphs at ten the next morning to the other twenty-nine stations." [1]

[1] *Montreal Gazette.*

CHAPTER X.

MANUFACTURES.

Trade, Commerce, etc.

THE manufactures of Canada are but in their infancy, and are limited by the comparatively small population of the country. Nevertheless, as shown by the census returns of 1871, they then gave employment to 187,942 people, and represented a gross value of manufactured articles of $221,617,773.

The population is increasing rapidly; foreign markets are being opened in the West Indies and Brazil, and a healthy and rapid progress is being made in several important branches.

A large business is being established in the manufacture of beetroot sugar and in the preparation of fertilisers from native apatite. These industries are being fostered chiefly in the Province of Quebec by French capital, and it is anticipated that trade with France will follow in the export of these products.

Our manufactures may be classed as products from cereals, timber, fish, oils, minerals, metals, coal, clays, building stone, phosphates, gypsum, petroleum, woollen fabrics, cotton goods, hemp and flax products, hides and leather, dairy products, as butter and cheese, prepared meats of cattle, sheep, and pigs, preserved and canned fish, lobsters, oysters, and fruits, not omitting ship-

building and agricultural implements, carriages, sleighs, fur goods, hats, caps, boots and shoes, as well as explosive materials for blasting, and all railway and telegraph materials; the whole constituting a list which comprises all the manufactures of older countries, and promises to grow to vast proportions under the energy and ingenuity of the people, encouraged by the prosperity of the country and the fostering care of the Government.

Theorists discuss the question of free trade and protection, but the national policy of Canada is to raise a revenue to maintain the credit of the country, to prosecute its public works, to encourage manufactures and the employment of the industrial classes, and to levy the taxes in a manner which will be as generally and evenly distributed as possible over the entire population.

Under this system Canadian manufactures are daily and rapidly increasing, and capital and population are being attracted to the country. In this prosperity of the industrial classes the agriculturist in common with other classes shares; and the free trade theory, however true when applied to the whole world, is apparently inapplicable when applied to sections of it isolated by nature and not admitted into a general partnership.

Fisheries.—From the banks of Newfoundland and the Atlantic provinces over the Gulf of the St. Lawrence, along the coasts of Labrador and Hudson Bay, around the shores of the three great oceans down to Vancouver, through innumerable straits, seas, and inlets, thickly studded with islands and archipelagoes on the grandest scale, Canada possesses thousands of miles of sea-coast swarming with fishes. Her inland fisheries too are of great value. Apart from the lakes on the United States

boundary, all the larger lakes of the continent are in Canadian territory, as well as innumerable rivers abounding in salmon.

By the treaty of 1818 the United States has the right to take fish on some 380 miles of the south and west coasts of Newfoundland, from the Rameau Islands on the south to Quirpon Islands on the north; on the shores of the Magdalen Islands (in the Gulf of St. Lawrence), which have 100 geographical miles of coast, and indefinitely along the shores of Labrador. But the treaty gives her no such rights on the shores of Quebec, Nova Scotia, New Brunswick, Cape Breton, or Prince Edward Island. The cession to the United States of the right to fish on these coasts also for ten years, from 1st June 1874, is made in the Treaty of Washington, July 1871.[1] This treaty allows Canadians, down to latitude 39° on the coast of the United States, the same rights as Canada grants to the fishermen of the States; and to compensate us for the superiority of the privileges ceded, $5,000,000 has been awarded to Canada.

The total value of the exports of fish and oils from the Dominion in the year 1879 amounted to $7,072,203.

A supplementary report issued by the Department of Marine and Fisheries contains some interesting statistics of the shipping of Canada. From it we learn that the total number of vessels remaining on the registry books of the Dominion on the 31st of December 1880, including old and new vessels, sailing vessels, steamers, and barges, was 7377, measuring 1,311,218 tons register tonnage, being a decrease of 94 vessels and 20,876 tons register as compared with 1879. The number of steamers on the registry books on the same date was 918, with a gross tonnage of 190,159 tons and a net tonnage of

[1] Should either party desire to terminate this agreement, two years' notice must be given after the expiry of the ten years.

120,141 tons. Assuming the average value to be $30 per ton, the value of the registered tonnage of Canada on the 31st December 1880 would be $39,336,540, or £7,869,308 sterling.

From a statement compiled from the *Répertoire Général* for 1880 and 1881, it appears that the tonnage upon the registry books of the British Empire, including Canada and the other colonies, was 8,259,748 tons register. The United States of America comes next with a tonnage of 2,438,912 tons, followed by Norway with a tonnage of 1,420,788. Canada stands next with a tonnage of 1,311,218 tons, followed by Germany with a tonnage of 1,157,178 tons. From this statement it appears that Canada is fourth on the list of the ship-owning countries of the world; but these figures do not include the tonnage of inland sailing vessels or of steamers under 100 tons register, except in the case of Canada. The Canadian figures include registered vessels of every description and registered steamers of every tonnage.

This report contains also much interesting information in relation to the value of the fisheries of Canada. The kinds of fish which abound most largely in Canadian waters can be ascertained by the following table for the year 1880, when the yield was one of the largest recorded :—

Cod	$4,534,009
Mackerel	2,178,966
Salmon	635,427
Herrings	1,511,012
Haddock	406,075
Lobsters	2,143,312
Whitefish	203,018
Trout	134,897

Notwithstanding the large dimensions which this industry has already assumed, as shown by the foregoing figures, it may safely be predicted that when the prolific

fishing ground of Hudson Bay and of the Arctic and Pacific coasts are entered upon, these figures will soon be doubled. At the mouth of the Mackenzie River and along the 70th degree of north latitude, the Americans many years ago stated that they had taken in one season $8,000,000 to $10,000,000 worth of fish.

The codfish is obtained chiefly in Nova Scotia, and in the Gulf within the Province of Quebec; mackerel and haddock are obtained most largely in Nova Scotia, herrings in New Brunswick, lobsters in New Brunswick, Prince Edward Island, and Nova Scotia, salmon in British Columbia, and trout and whitefish in Ontario. The number of men employed in 1880 and the number and value of vessels and boats were as follows:—

	Vessels.		Boats.	
Men.	No.	Dols.	No.	Dols.
57,421	1,181	1,814,688	23,848	708,563

Averaging a family at five persons, it would appear that 287,105 persons, or one-fifteenth of the population, are directly sustained by fishing, and that the capital employed in the industry, irrespective of tackle, amounts to $2,523,000. It is not probable, however, that all those engaged in fishing are heads of families, inasmuch as the aggregate value of the catch represents an earning of only $250 per annum for each engaged,—an amount too small to maintain a family, although sufficient to afford a comfortable living in cases where two or more of a family prosecute the industry. There are twelve fish hatcheries in the Dominion, the expense of maintaining which was, in 1879-80, $29,109.61. From these breeding establishments there were distributed, in the spring of 1880, 21,520,600 young fish, of which 14,300,000 were white fish, and 6,300,600 salmon, and last fall there were deposited in the hatching troughs of these breeding establishments 26,212,000 vivified eggs, of

which 18,000,000 were white-fish, and 8,084,000 salmon and salmon trout. The whole expense of the fishery department of Canada was $86,162.55 in 1880, and from this amount has to be deducted collections amounting to $19,423.16, leaving the net expenditure only $66,739.39, a remarkably small outlay considering the importance of the industry.

Dairy products form an important item in the exports of the Dominion, the aggregate annual value of butter and cheese shipped averaging over 10 per cent of the whole value of domestic exports. The value of these articles exported during the fiscal year 1878-9 was $5,892,197, being a decrease of about half a million dollars from the previous year, and a million dollars less than 1876-7, which is the largest year, by value, on record. The cheese trade has assumed its present proportions within a decade. The total quantity exported during the year 1878-9 was 49,616,415 lbs., showing an increase of 10,000,000 lbs. over the previous year, and about double the average of the years 1870-77. Canadian cheese has gained a high reputation, and at the International Dairy Fair, held at New York, carried off the prize of $100 for the best cheese made anywhere.

The principal customers of Canada for butter, in 1879, were—Great Britain, to the extent of 12,859,274 lbs.; United States, 292,852 lbs.; and Newfoundland, 1,161,508 lbs. Of cheese, in 1879, 47,160,808 lbs. were shipped to Great Britain, and 2,311,776 lbs. to the United States. Of eggs, the bulk of the export is to the United States, which received from Canada in 1878-9 more than five million dozen.

Poultry-raising is only beginning to be much looked after in Canada, probably because poultry is so cheap. In course of time, however, as the market extends, and as means are found of exporting fowls, geese, and turkeys

to England, henneries on a large scale will be established. The exportation has already begun.

Bee-keeping is profitably carried on in many parts of the Dominion, and the late introduction of Syrian and other foreign bees is likely to make bee culture in Canada an important industry.

Near the large towns, market gardening is profitably carried on. A comparatively small capital is necessary, and with industry and perseverance, backed up by experience, a good income is assured. Like everything else, however, none but those who have had experience in Canada should attempt it.

These few points show that what may be termed the smaller branches of farming are not neglected by the Canadian husbandman. Still much remains to be done in this respect.

The export cattle trade has made rapid strides in the last few years. The total value of live stock exported for year 1878-9 was $2,648,983 more than in 1874-5, nearly the whole of which is in exports to Great Britain, which were almost nominal in the earlier year, that trade then being in its infancy. The bulk of the exports were formerly to the United States and Newfoundland. Another cause for congratulation is that, while the exports have been increasing, the imports from the United States have been decreasing: in 1874-5 they were $999,787, or about 50 per cent of the exports; in 1878-9 they had fallen to $441,930, or less than 10 per cent of the exports, showing that this large increase in the trade was supplied by home-raised cattle.

We may add that the latest returns show an extraordinary increase in the production and consumption of home industries, and the statement of the Revenue and Expenditure of the Dominion for the fiscal year 1880-1 gives a large surplus of revenue. Canada, like the mother

country, is not without a public debt, but the pacific purposes for which it has been incurred cannot fail ultimately to promote the prosperity of the country. The debt is not, says Sir Alexander Galt, as is the case in every other country, excepting always the various British colonies, the melancholy record of blood and treasure squandered in foreign or intestine wars; but, on the other hand, registers the peaceful progress of a people conscious of the vast resources of their country, and earnestly devoting themselves to its development.

CHAPTER XI.

THE PEOPLE.

1. *Numbers.*

By the Census Act, 42 Vict. cap. 21, a decennial census is taken in Canada. Under the last one in 1881, we find the population of the older provinces to be as follows:—

Dominion of Canada, ordinary population . .	4,324,810
Indian population—Census, 1871 . . .	102,358
Newfoundland—Census, 1874 . . .	161,374

The increase under the French *régime* between 1605 and 1760 was slow, as shown in the following table. Since then there has been a steady and fair increase in spite of many hindrances, the greatest being a want of knowledge of the geography, climate, and resources of the country. At last a new era appears to have dawned, and it is reasonable to expect that there will be henceforth a large influx of population into Canada.

The following table shows the progress from the first settlement in 1605 to the present time, 1881:—

In 1605, Port Royal had a population of . . .		44
1608, New France (Quebec)		28
1613, St. John's (Newfoundland) . . .		62
1701, Acadia		1,134
1698, Newfoundland, English . . .	1,500	
French . . .	466	
		1,966
1706, New France		16,417
1739, ,, ...		42,701
1741, Newfoundland, English . . .		6000
1749, Acadia . . .	13,000	
Cape Breton . . .	1,000	
New Brunswick . . .	1,000	
Prince Edward Island . .	1,000	
		16,000

In 1760, New France	70,000	
1762, Nova Scotia, English	8,104	
		78,104
1790, Canada		161,311
1861, ,,		3,090,561
1871, ,,		3,485,761
1881, ,,		4,271,424

The population of the four provinces forming the Dominion at the Census of 1871 consisted, to the extent of more than four-fifths, of natives of British North America. These numbered 2,900,531, of whom 1,138,794 were natives of Ontario, 1,147,664 of Quebec, 360,832 of Nova Scotia, 245,068 of New Brunswick, 405 of Manitoba and British Columbia, and 7768 natives of Prince Edward Island and Newfoundland. Of alien born inhabitants the most numerous at the Census of 1871 were 210,451 natives of Ireland, 144,999 of England and Wales, 121,074 of Scotland, 64,447 natives of the United States, and 24,162 natives of Germany.

The following table shows the growth of the five older provinces during the past forty years :—

	1842.	1851-52.	1860-1.	1871.	1881.
Ontario	487,053	952,004	1,396,091	1,620,851	1,913,469
Quebec	697,084	890,261	1,111,566	1,191,516	1,358,469
New Brunswick	—	193,800	252,047	288,594	321,129
Nova Scotia	—	276,854	330,857	387,800	440,585
Prince Edward Island	—	—	80,857	94,021	107,781

Increase of population in the cities of Canada—

	1871.	1881.	Increase.	Per ct.
Montreal	107,225	140,682	33,457	31
Toronto	56,092	86,445	30,353	55½
London	15,826	19,763	3,937	25
Ottawa	21,545	27,417	5,872	27
Hamilton	26,716	35,965	9,249	34
Kingston	12,407	14,093	1,686	14
Quebec	59,699	62,447	2,748	4½
Halifax	29,582	36,102	6,520	22
St. John	28,805	26,128	−2,677	−9

The increase in the past ten years has been 664,337 in the five older provinces, or 18·02 per cent against 15 per cent in 1861-71. This growth may perhaps be thought unsatisfactory when it is compared with the

increase of 30 per cent made by the United States in the same period; but it is manifestly unfair thus to compare the two countries, since the increase in the United States, which gives this large percentage of growth, occurred almost wholly in the Western States. With the Canadian North-West now opened for settlement, with railway communication throughout that territory being rapidly pushed to completion, and with more active energy in promoting emigration to that country, there can hardly be a doubt that the decade upon which Canada has recently entered will witness quite as large a percentage of growth as has been enjoyed by the Western States in the past, or will be made in the future. But the percentage of increase in the five older provinces of the Dominion is about equal to that of the New England States of the United States, viz. 14·55 per cent against 15 per cent; while Ontario shows a growth of 3 per cent more than the New England States, and only about 2 per cent less than that of the Middle States.

It will be noticed from the terms of the Census Act that the census details required are very comprehensive. Each census according to the Act shall be so taken as to ascertain with the utmost possible accuracy, in regard to the various territorial divisions of the country, their population, and the classification thereof as regards age, sex, social condition, religion, education, race, occupation, and otherwise; the houses and other buildings therein, and their classification as dwellings, inhabited, uninhabited, under construction, and otherwise; the occupied land therein, and the condition thereof, as town, village, country, cultivated, uncultivated, and otherwise; the produce, state, and resources of the agricultural, fishing, lumbering, mining, mechanical, manufacturing, trading, and other industries thereof; the municipal, educational, charitable, and other institutions thereof; and whatever other matters may be specified in the forms and instructions.

The extent of the Dominion and the wide distribution of population add to the ordinary difficulties of census enumeration; still, the care taken under the system adopted secures a near approximation to the facts, and should there be any error it is probably on the side of an under estimate in the number of the population.

It is useless to attempt any calculations as to future increase from the data of the past, but Canada's position at the present time is very favourable for a large and rapid increase, in consequence of the forced exodus of the European nations from overcrowding, and the advantages for settlement which this country affords.

Placed as we are beside the United States, it becomes of interest to compare our position with theirs, and the following figures show that the Dominion in 1861 had a population about equal to that which the States possessed when they achieved their independence. In 1790 the population of the United States was 3,929,827. The population of the Colonies comprised in the Dominion of Canada was, in January 1861,—

	Males.	Females.	Total.
Upper Canada (now Ontario) .	725,575	670,516	1,396,091
Lower Canada (now Quebec) .	567,864	543,702	1,111,566
New Brunswick . . .	129,948	122,099	252,047
Nova Scotia	165,584	165,273	330,857
	1,588,971	1,501,590	3,090,561
To this we must add, if we desire to show the full strength of the British population in North America at that date:			
Prince Edward Island . .	40,800	39,977	80,857
Newfoundland (1857) . .	65,118	59,170	124,288
British Columbia and Vancouver's Island . . .	20,862	13,954	34,816
Rupert's Land, including the Red River Settlement . .	51,000	50,000	101,000
Total . . .	1,766,751	1,664,691	3,431,522

The decennial censuses of the United States are as follows:—

In 1790 .	3,929,827	In 1840 .	17,069,453
1800 .	5,305,925	1850 .	23,191,876
1810 .	7,239,814	1860 .	31,445,089
1820 .	9,638,131	1870 .	38,555,983
1830 .	12,866,020	1880 .	50,155,783

From this comparison, coupled with the great natural increase of the population independent of immigration, it may be anticipated that in two decades from now, or at the end of the present century, Canada will have attained a population of 7 millions; and in 60 years from now, or two generations hence, of 23 millions. The sparseness of the present population to the square mile, compared with the extent of territory, is seen by the following table:—

Ontario . .	15 souls	Prince Edward Island	44 souls
Quebec . .	6 ,,	Newfoundland .	3 ,,
New Brunswick .	11 ,,	British Columbia and V. Id. .	1 to 5 sq. miles
Nova Scotia . .	21 ,,	Rupert's Land	1 to 50 sq. miles
The Dominion .	10 ,,	General average of B.N.A.,	1 to the sq. mile

These figures appear almost ludicrous when we compare them with the 253 souls to the square mile of Great Britain and Ireland, the 177 of France, the 432 of Belgium, the 320 of China, etc. etc. They show us how much has yet to be done to fill up the vast territory of British America.

2. *Physique of the People.*

Harvey J. Philpot, M.D., Assistant Surgeon to Her Majesty's Forces in the Crimea and Turkey, says in his *Guide Book to Canada* (London, 1871), p. 67—

"Canada is an exceptionally healthy country. I do not hesitate to make the statement after seven years in

the country engaged in an extensive medical practice. As a race the Canadians are fine, tall, handsome, powerful men, well built, active, tough as pine knot, and bearded like pards. The good food upon which they have been brought up [with the invigorating climate], appears to develop them to the fullest proportions of the *genus homo*."

Marshall, in his recent work on Canada, says—"I am persuaded that, despite its severity, the climate of Canada is one of the healthiest in the world. It is expressly fitted to develop a hardy race. For the bringing up of a young family, it is to be preferred very decidedly to the climate of almost all the states of the Union south of the chain of Canadian lakes. The fact of the generally healthy condition of the people, the splendid development of the men, the preservation of the English type of beauty of the women, may be taken in proof of the excellence of the climate" (pp. 237-8).

"The Canadian, whether English, Irish, or Scotch, is well-proportioned and vigorous, often tall, with broad shoulders, sinewy frame, and capable of great endurance. He is quick of resource, enterprising, sober-minded, persistent, and trustworthy. The races of the British Isles and of Norway have certainly not degenerated here" (p. 5).

There is a point worthy of special notice by the English people, who suffer so severely from throat and lung diseases, that the dry bracing air of Canada, and particularly of the North-West, affords a greater security against consumption and more curative results than the balmy south. This fact is being recognised by the leading physicians of Great Britain.

As compared with the Western States, where the bane of the country is ague, it may be stated that ague and bilious fevers are unknown on the prairies of Canada.

It does exist in some of the low parts of Ontario, but not in Quebec or in the North-West.

The natural increase of the population is extraordinary, particularly among the French Canadians, many families numbering twenty, and sometimes more, children.

3. *Military Position and Militia.*

"The position of Canada for defence is the strongest possible. With her north inaccessible, her east and west resting upon the Atlantic and Pacific, Labrador on her left, and the mountains of Columbia—the coast range, the Blue and Rocky Mountains—on her right, she never could be approached, by the most powerful nations, except from the south; and here she has fastnesses more inaccessible than Scythia in her Ottawas, St. Maurices, and Lake regions. Even admitting that these, defended by a hardy population, could be overcome during the summer, the winter frosts and snows would force back the enemy and limit the invasion to half the year. When our interior shall have been settled, the country, from its very extent, would defy conquest.

"Let the reader run his eye over the map of the world, and he will see that there is no country so impenetrable and invulnerable as Canada. Every nation of Europe and Asia has, in turn, been overrun—the enemy meeting few obstacles but opposing armies; a Northern army marched through the Southern States; a Southern army penetrated the north, and was checked only by superior force. Russia is the only country at all resembling Canada in the strength of its natural defences; but European Russia is a vast plain, and Napoleon laid it waste, against the whole force of the empire, for 700 miles from its western frontier to the ancient capital. Winter, however, did for the Russians what their armies

could not do. Canada, in addition to winters of Russian severity, is everywhere studded with barriers to an invading army, and with the strongest strategic positions for defence."

The Canadian militia consists of all male British subjects between the ages of 18 and 60 years, not exempted or disqualified by law. These are divided into four classes, establishing the order in which they will be called upon to serve.

1st Class: Unmarried men, or widowers without children, between 18 and 30 years.

2d Class: Unmarried men, or widowers without children, between 30 and 45 years.

3d Class: All married men, or widowers with children, between 18 and 45 years.

4th Class: All between the ages of 45 and 60 years.

The Militia is divided into "Active" and "Reserve." The Active consists of Volunteer, Regular, and Marine Militia.

The Volunteer is composed of corps raised by voluntary enlistment.

The Regular consist of volunteers for that service, or of balloted men.

The Marine or seamen of sailors on steam and sailing craft of the Dominion.

The Reserve embraces the whole not serving in the Active Militia for the time being.

The active force is by law fixed at 40,000 men—the reserve at 600,000.

Provision is made for annual paid drills from 8 to 16 days of 40,000 men in addition to officers of the Reserve, the number being regulated by the money vote of Parliament each year. For the present the number is 30,000.

The Active Militia is clothed, armed with breach-

loaders, and equipped ready to take the field at short notice.

The number called out for annual drill has ranged from 20,000 to 40,000 and over, according to the money voted for the purpose.

The returns of the Reserve show a force of over 700,000 men upon the rolls.

After the Fenian invasion the Volunteer force tendering service was 45,040 men. In 1869 the Active force was as follows:—

	Officers and Men.
Cavalry	1,500
10 Field Batteries (42 guns, 441 horses)	750
Garrison Artillery	3,558
4 Companies Engineers	232
Naval Brigade, Halifax	233
73 Battalions Rifles and Infantry	37,268
Total	43,541

In 1870 the Fenians entered the Province of Quebec at two points, and were met in both cases by Volunteers in sufficient force to defeat them. The men were called out on the 24th of May, and on the 27th 13,540 officers and men were reported at the posts assigned them.

Dominion Artillery Corps have replaced the Imperial troops at Quebec and Kingston, at both of which places there are schools of gunnery. Infantry schools are established at Toronto, Kingston, Montreal, Quebec, Fredericton, and Halifax, at which thousands of officers have obtained certificates.

A military college for the education of cadets, with a four years' course of study, is established at Kingston.

In his report on the Canadian Militia to the Dominion Government in March 1870 Colonel P. Robertson-Ross says—"The rural battalions are almost entirely composed of the agricultural population, the bone and sinew of the

land, who have a stake in the country, and in many instances are the proprietors and sons of proprietors of the land; *and it is impossible to see a hardier race, or finer material for soldiers.* In many instances their physique is most remarkable, and they all appear imbued with a spirit of great loyalty to their Queen and country; and the same spirit and aptitude for military service are exhibited by the city battalions." These facts justify the statement of Sir John A. Macdonald, that Canada is a source of strength—not of weakness—to the empire.

4. *Visitors.*

When so many thousands of the better classes of the English people seek health or recreation on the Continent —especially during the summer and autumn of each year —it is a matter of surprise that so few ever think of visiting the New Britain on the other side of the sea. Though all who have taken a run through Canada in the holiday season give a glowing account of the magnificence of the scenery, the perfection of the means of travel, and the comparative cheapness of living, tourists from the mother country are not nearly so numerous as the attractions of the journey would lead one to expect. The Americans, who are always in search of pleasant resorts, are wiser in their generation than their English cousins. Thousands of them visit Canada every summer. They come even from the States in the far south, and are to be met with at the watering-places, in the towns and cities, and on the railways and steamboats, in every part of the Dominion. The Englishman will run off to the Continent, see Paris and Rome, "do" Switzerland, or swelter in a little German watering-place, and return little better in health and much poorer in pocket, entirely oblivious of the fact that he might have crossed the

Atlantic and spent a few weeks very profitably and pleasantly, and certainly more cheaply, among people of his own race and nationality. The number of English pleasure-seekers who visit Canada is, however, increasing year by year, and it only requires that the attractions of the journey should become more widely known to make this one of the chief holiday excursions for Englishmen and their families. Let us, in imagination, make the trip with the reader.

On a pleasant summer's afternoon, say about the middle of July, we find ourselves on the deck of one of those moving villages, a transatlantic steamer, in the Mersey. All is bustle and noise; everything seems topsy-turvy, for the last of the passengers, with mountains of luggage, has just come aboard, and the ship is on the point of sailing. In a few moments the last good-byes are said, the tender casts off, the machinery moves, and the great ship glides slowly down the broad stream, bound for the Far West.

On the fifth or sixth day out from Ireland the rugged coast of Newfoundland is sighted, and another day's run takes us through the Strait of Belle Isle into the Gulf of St. Lawrence. A few hours later the island of Anticosti is seen on the right, and the first signs of civilisation appear in the shape of a fishing hamlet or two at the water's edge. Farther on the mighty St. Lawrence itself is entered, and thence to Quebec there is land on either side, though at certain points, so great is the width of this majestic river, it cannot be seen except in very clear weather. Ascending the stream, village after village of the French inhabitants is passed, their white houses nestling in pleasant gardens, with a glorious background of deep green, stretching away in the distance as far as the eye can reach, and forming a characteristic and charming picture. And so we move on, the towns in-

creasing in number and size, till, on the eighth or ninth day out, the grand old fortress of Quebec looms up as we round Point Levis; a little later the noble ship is at the landing-stage, and the traveller steps ashore on Canadian soil.

Quebec is the most Old World city, and one of the most interesting on the American continent. Here a day or two can be most agreeably spent in visiting the Falls of Montmorenci, the Plains of Abraham, the citadel, and other interesting sights inside and outside the walls of this venerable city, which, because of its strength as a fortress, is called "the Gibraltar of America." Thence the traveller goes westward, either by rail or by river steamer; if by the former, some very fine agricultural districts are traversed; if by the latter, a charming trip of 180 miles up the St. Lawrence is made under the most favourable circumstances in one of those "floating palaces" for which the lakes and rivers of the New World are famous.

Two or three days may be profitably spent at Montreal, the commercial metropolis of Canada, and one of the finest cities on the American continent. The drives around the town are delightful, the churches are massive and grand, while the Victoria Bridge, which crosses the St. Lawrence here at a point where the river is two miles wide, is one of the most wonderful structures in the world. From Montreal to Ottawa by rail or river is our next stretch. The capital of the Dominion is well worth visiting, for its artificial as well as for its natural beauties. The Houses of Parliament and departmental buildings are justly ranked amongst the best in America. A well-known writer has described them as being among the "architectural glories of the world." The Rideau and Chaudière Falls are wonderfully beautiful. The saw mills, which are here by the score, turning out their millions of

feet of boards each day, never fail to prove full of interest to the European tourist. This is the centre of the timber trade—one of the leading industries of Canada; and at any time hundreds of acres of "lumber," as the boards are called, may be seen piled over the islands and on the river banks. By rail from Ottawa to Prescott, thence westward by the Grand Trunk through a fine agricultural country and past many flourishing towns, any of which would be well worth visiting if time permitted. The run, however, is made through to Toronto, 333 miles west of Montreal. This is the second city in Canada in wealth and population, and one of the most attractive. Its public buildings and institutions are numerous; and, in visiting these, as well as driving through the wide and beautiful streets, a few days are pleasantly passed. From this point many routes are open, but we choose the Northern Railway, and go by steamboat and waggon as far as possible into the Muskoka country; in other words, into the backwoods of Canada. It was only a few years ago that these townships were thrown open for settlement, and now they contain a very considerable population, with several flourishing towns and all necessary branches of industry. This is known as the "Free Grant District," as the land, which belongs to the Ontario Government, is given absolutely free of all charge to actual settlers. The scenery along the numerous lakes and rivers is unsurpassed in rugged beauty. But this district is attractive chiefly for the reason that it affords opportunities for getting an insight into what is called "roughing it in the bush;" in other words, the sort of life the first settlers in the backwoods of Canada lead, with all its hardships and its drawbacks, as well as its pleasures and its freedom. We shall be compelled to rough it ourselves, but this will only make our experience the more enjoyable. A week or so here, then out into civilisation again, up the

Northern Railway to the town of Collingwood, and thence by steamer to the head of Lake Superior. This trip through the upper lakes is surrounded with many attractions. Traversing the largest body of fresh water in the world, through groups of charming islands of every size and shape, we enjoy the grandly massive scenery of Lake Superior, visit the copper and silver mines for which this region is famous, go to the very limit of civilisation in this direction, and at the various stopping places see many families and villages of the Canadian Indian little removed from his original condition of barbarism. The head of Lake Superior reached, we may return by another fine line of steamers to Sarnia, and back to Toronto by the Grand Trunk Railway, through one of the finest farming districts in Canada. This trip will occupy about ten days from Toronto.

A two hours' sail across Lake Ontario brings us to the old town of Niagara, formerly the capital of Upper Canada, now a summer resort. Thence we run by rail up the west bank of the majestic river, a distance of about twelve miles, passing through scenes of historic interest, and alight at Clifton, within sight and sound of Niagara's mighty cataract. Two or three days will be sufficient here, though we should be glad to spend as many weeks, did time permit. Taking the Great Western train at Clifton, we run westward through one of the finest fruit-growing districts in the world. On every side are orchards of apples, peaches, plums, and berries, vineyards with their wealth of clustering grapes, and gardens bright with a profusion of flowers. A day at the beautiful city of St. Catherine's; thence on to Hamilton, where another day may be most pleasantly spent. Here, if time presses, either train or steamboat can be taken for Montreal, about 400 miles distant. It will be better, however, to run on to London by the Great Western, and thence by the

Grand Trunk to Guelph. This will again take us through the very best farming district in Ontario, and enable us to form some idea of the agricultural wealth of the province. At Guelph the Model Farm, which is carried on under the provincial government, may be visited, as well as some of the splendid farms for which the county of Wellington is remarkable. A few hours' run by the Grand Trunk brings us once more to Toronto. Should time permit, we may take a trip over one of the narrow gauge railways into the beautiful country north-west and north-east of Toronto, and returning take a lake steamer for Montreal. Steaming along the shores of Lake Ontario, we halt at many beautiful and flourishing towns, and enter the St. Lawrence at Kingston. Between this point and Montreal is one of the most charming excursions imaginable, through the ever-varying but always beautiful Thousand Islands, and over the boiling surging rapids. Nothing can be conceived more enchanting and more exciting than "running the rapids;" and, when the pleasure and danger are past, and the steamer is moored to the wharf at Montreal, our hope is that we may soon be able to repeat the trip.

If time permits, a run should be taken from Montreal to Lake Memphremagog, which is remarkable for the beauty of its surroundings. Then having come from Quebec by water, we return by rail. The ship is in the stream ready to start, and an hour later we are ploughing our way down the mighty river. Two hundred miles below Quebec the mails are taken on board, and in eight days more we are home again in "merrie England."

This is a holiday trip that any Englishman of moderate means may safely undertake. It can easily be done within eight weeks; the cost is not so great as if the same time were spent on the Continent, or even at a fashionable English watering-place; while the attractions which

the trip presents are so varied, so novel, and so numerous, as to far surpass those of any ordinary European tour.

5. *Artists.*

As in all new countries, the fine arts did not make much headway in Canada until within the last few years. Men were too much taken up with trade and commerce—too eagerly struggling for wealth, to give up any portion of their time to art studies. Yet as wealth accumulates, and as education elevates the mind, the public taste becomes refined, and a desire for such things manifests itself. Canada is a country fitted by nature to make its people love the grand, the beautiful, the sublime. Her vast rivers, her mighty waterfalls, her lovely lakes, her grand forests, her beautiful valleys, her towering mountains, and her charming pastoral scenes, present a variety of scenery that cannot be surpassed. Such surroundings as these must tell in time on the tastes of any people. And so, we are glad to say, it is in Canada.

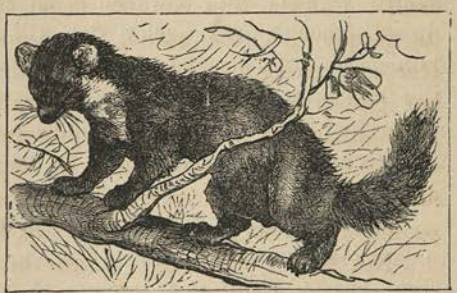
Not many years ago, before the present degree of refinement and culture had been reached, a painter could hardly make a living in Canada. Now there are scores. In the province of Ontario there is a society for the promotion of native talent; and there is annually a very pleasant re-union, at which the works exhibited are drawn for as in the London Art Unions. The subjects are generally Canadian water-colours, though a few artists confine themselves to oil paintings. It would be unreasonable to expect them to rival the works of European painters, yet there are several very promising artists in the Dominion, some of whom may yet be heard of on the other side of the Atlantic.

The English painter in search of new subjects cannot do better than go to Canada. There he will find every

variety of scenery imaginable, while at the same time he will enjoy an "outing" that cannot fail to invigorate and strengthen both body and mind.

6. *Attractions for Sportsmen.*

Canada offers a splendid field for the sportsman. Game and fish are abundant. All game is common property; the sportsman is at liberty to shoot where he likes, what he likes, and when he likes, with this exception, that during a certain time of the year it is illegal to take game. This is necessary in order to preserve it from total destruction. However, no true sportsman — law or no law — would kill game out of season. The climate, as we have already said, is invigorating and healthy; and experienced guides and assistants can be engaged in any part of the country. The sportsman need experience no difficulty in suiting his taste. He can have any form of sport he likes, from bagging squirrels and partridges and pigeons in the old settlements to tussling with grizzly bears in the wild cañons of the Rocky Mountains. The royal tiger and the lordly lion he will not find; but if he be sufficiently venturesome he may gather together a collection of hunting trophies of which he will have no reason to be ashamed, and at the same time undergo excitement and danger sufficient to satisfy any reasonable mortal.



MARTEN IN LABRADOR.

In the way of wild animals there are in the old pro-

vinces bears, foxes, wolves, moose, cariboo, red deer, otter, mink, pine marten, sable, hares, racoons, squirrels, etc.; while in the Far West there are immense herds of buffaloes on the plains, and grizzly bears and other animals in the Rocky Mountain region. Of feathered game there are woodcock, snipe, pigeons, plovers, partridges, quail, geese, ducks, brant, curlew, and prairie fowl; while of eagles, hawks, owls, and other such birds there are many varieties.

On arriving in Canada, the sportsman, if he has no friends in the country with whom to consult, should at once call on the nearest government agent, who, even though he may not know much about sporting matters himself (though most agents do), will place him in communication with persons who will afford every assistance. The half-breeds are, as a rule, trustworthy, honest, and respectful; still it is always the best policy to have the advice of one in authority in making your arrangements.

In the forests of New Brunswick and Quebec, moose, to say nothing of other game, large and small, are abundant; but it would not be safe to enter on the chase without experienced guides. These can be had without difficulty and at a small cost. Most of them are Frenchmen, or a cross between the French and the Indian. They are active, enduring, shrewd fellows, thoroughly trustworthy, hardy in camp, and cunning on the trail. They will find the game if it is to be found at all, and when brought down they know how best to treat such parts as are to be preserved as trophies, and how to cure the choice cuts of the meat. The French and half-breeds are to be preferred to the full-blooded Indian, because they are more cleanly as a rule, and much better cooks than the latter. It is not well, however, to allow any of them, especially the Indians, too

REINDEER.

To face page 553.

much liberty with the spirit flask. After a hard day's work on the trail, they are deserving of a glass of whisky and water, but let it be one and no more. Moose and cariboo hunting is a hard, tiresome, and occasionally a very exciting amusement.

While on the moose trail the hunter comes across a variety of other game, beasts as well as birds, and thus he is enabled to form an interesting and sometimes valuable collection.

Duck shooting is to be had in every part of Canada. The birds come north in the spring of the year, and make their homes for the summer in the numerous small lakes to be found in the interior of every province. They hatch their young on the shores, bringing them up on the wild rice and other food with which the lakes abound. In the autumn they are to be seen in countless thousands. Two men well up in the sport may easily bring down three hundred brace in a day. Such shooting does not compel one to go beyond the confines of civilisation. Many of the best lakes for the purpose can be reached from the large towns in a few hours by rail or coach. At or near the lakes there are clean, comfortable, well-kept hotels, where one may be accommodated for four, six, or eight shillings per day, everything included. Wild geese are frequently killed in these lakes, though as a rule they spend the summer farther north; while in the woods near the lakes a day's shooting is almost certain to bring the sportsman a well-filled bag of miscellaneous game. It is essential, however, to have one or more well-trained dogs, and these are not readily procured in the country.

The best and most exciting sport on the American continent is buffalo hunting, and the best fields are the grand prairies of the North-West. The party should be provided with good breech-loading rifles, a revolver each, and an abundant supply of ammunition.

The hunting grounds may be reached by Canada Pacific railroad from Prince Arthur's Landing Thunder Bay to Winnipeg, or by way of Sarnia and Collingwood and the Great Lakes to Duluth; thence by the Northern Pacific to Glyndon; and thence by the St. Paul and Pacific Railway to Winnipeg. There is also the choice of an all-rail route *vid* Chicago and St. Paul, in the United States. The Lake route will be found particularly pleasant, and the time taken is very little longer.

There is a class of men in Manitoba known as "plain hunters," from the fact that they live chiefly by buffalo hunting. They are nearly all half-breeds, a cross between French or English and Indians, and are undoubtedly the most expert and successful buffalo killers on the American continent. The services of a few of these men can be secured without difficulty and at a moderate cost. Their horses, an active, wiry breed, are trained to the sport, and appear to take as much pleasure in it as do their masters. At Winnipeg, men, horses, tents, camp furniture, and everything else necessary for a hunt over the prairies, can be either hired or purchased.

It is not intended here to describe a buffalo hunt, with all its excitement, danger, and novelty. Enough to say that it is the perfection of hunting; and as horse, rifle, and revolver are brought into service, it will at once be seen that it has special attractions for Englishmen, accustomed as they are to both hunting and shooting. To the genuine sportsman nothing can be more enjoyable; and he returns after his two months on the plains feeling that he has at last, for a time, been in reality a dweller in "the happy hunting grounds."

Those who have time and who have made the necessary preparations may extend their trip westward to the Rocky Mountains in search of bears and other large game. They may even pass onward into British Columbia, the

forests of which afford splendid sport; or northward to the land of the musk ox and the reindeer.

Prairie fowl may be killed in any number on the plains, while the lakes swarm with ducks and geese.

Canada has the best fisheries, inland and marine, in the world. A recent pamphlet issued by the Nova Scotian Government says:—

"In some seasons our bays and harbours teem with fish of various kinds—mackerel, herring, cod, haddock, halibut, hake, pollock, shad, smelt, perch, eels, etc. Lobsters are abundant, and are usually sold in the Halifax market at about one shilling per dozen. Good sport is afforded in spearing lobsters at night by torchlight. We have a plentiful supply of shell-fish, viz. oysters, scallops, clams, quahaugs, mussels, etc. Indeed, no country in the world can produce a greater variety of sea fish, or in greater abundance; while the rivers and lakes afford salmon, trout, and grayling. Any boy with a bean-pole, a half-dozen yards of twine, with a hook on the end of it, and a few angle worms or grasshoppers, may go out in the morning and kill as many trout as will supply a large family for breakfast. In some lakes they are quite large, and are taken as heavy as four or five pounds. In other lakes they are small, seldom weighing more than one pound. The little brook trout is an excellent pan fish. The prince of all the trout tribe is the sea trout; this fish is taken in large numbers at the mouths of rivers emptying into the Atlantic."

All the rivers in Canada connecting with the sea, on the Atlantic as well as the Pacific coast, contain splendid salmon. The fish were taken indiscriminately and at all seasons up to a few years ago, when the Government stepped in and put a stop to the slaughter. The best salmon streams are in Nova Scotia, New Brunswick, Quebec, and British Columbia. In the upper lakes there

are numerous other varieties of fish which make capital sport. Some of the salmon rivers on the Lower St. Lawrence are leased from the Government; but permission for a week's fishing can be readily obtained. The lakes and rivers up the country are all free.

Brook trout may be taken in all parts of Canada, but the trout-fishers' paradise is to be found in the rivers on the north shore of Lake Superior, especially the Nipigon. This is a large, clear, cold, and rapid stream, affording splendid fishing from its mouth to its source. The fish run from one to seven pounds in weight; they are firm and hard, beautifully marked, and always "die game."

To reach the Nipigon the fishermen go to Collingwood or Sarnia from Toronto by rail, thence by steamer to Red Rock at the mouth of the river. At Sault Ste. Marie, on the way up, it is well to engage a couple of half-breeds and a canoe, having previously laid in the necessary camp furniture and provisions at Toronto. From Red Rock the party proceeds up the river about eight miles and there camps out. As the country is in a state of nature, one must rough it and live under canvas. Three weeks on the Nipigon will make glad the heart of any disciple of old Izaak Walton. It is glorious sport, and, as the surrounding scenery is grand in the extreme, the student of nature will find much to admire and think of in after days. The fish that are taken need not be wasted. The half-breeds know how to cure them so that they will keep for months.

CHAPTER XII.

INDIANS AND INDIAN TREATIES.

1. *General View.*

It is a matter of great difficulty to obtain reliable information respecting the Indian population; their migratory habits, and the great extent of country over which they are spread, misleading all calculations. Most of the estimates of the aboriginal population made by both early and modern writers, from information given by Indians themselves, or by travellers and traders, are doubtless over-estimated, so difficult is it to realise the fact of the enormous extent of territory necessary to supply man with food by the chase.

The question as to the past and present Indian population in what is now the Dominion of Canada has been clearly stated in the "Census of Canada, 1870-1," and it is there explained that, taking the whole of the aboriginal population of British North America, including the few tribes who live chiefly by agriculture and industrial pursuits in the older provinces, as well as the tribes placed in exceptionally unfavourable conditions in arctic climates, the mean inhabited superficies is thirty-four square miles

per head. Eliminating from the calculation those two extreme classes in the scale of comparison, the mean falls to about twenty-five square miles per head, the minimum being about ten square miles per head. This maximum is found in the most rigorous climates, and the minimum exclusively where there are abundant sea-coast fisheries. In the best hunting grounds with a temperate climate, in the absence of extensive fisheries and of cultivation of the soil, the increase of the Indian population to a larger ratio than one inhabitant to fifteen square miles causes misery and disease, or incursions upon neighbouring territories, and consequent warfare. Sir George Simpson, in 1857, in his replies to the Special Committee of the British House of Commons appointed to inquire at that date into the affairs of the Hudson Bay Company, points out the fact of these periodical oscillations of increase and decrease among the Indians. He states that the tribes of the western woods, after having been decimated by diseases for several years, were at that time passing through a period of increase; whilst the prairie tribes were at the same time suffering from decrease caused by tribal wars and disease. It is also evident that Indian populations keeping to the habits of hunting tribes diminish in number, in the ratio of the extent and frequency of their relations with civilised nations, by the destruction of their primitive means of existence and the introduction of vices and diseases, or by absorption in the creation of a half-breed race. Some of the earliest records (1611) are found in the Jesuit accounts. Champlain has also given estimates of certain tribes with which he held intercourse, but the most reliable statistics have been afforded by the records of the Hudson Bay Company, connected with their several trading posts throughout the country, and from the census enumeration of 1870-1 in the settled provinces of Canada.

It would be impossible to give the names applied by travellers, or by the natives themselves—sometimes according to locality or to dialect—to each of the tribes and sub-tribes of the Indians. The names sanctioned by the authority of ethnographers are classed as embracing four aboriginal families, and include all the native population of the Dominion, namely :—

1. The Eskimos, or Innoit.
2. The Dénè-Dinjiè.
3. The Algonquins, or Algie.
4. The Huron-Iroquois.

Their locations may be broadly stated thus :—

The Eskimos inhabit or frequent the coasts from Labrador on the north-east to Bering Strait on the north-west.

The Dénè-Dinjiès are found south of the Esquimaux and west of Hudson Bay, occupying all the territories north of latitude 58° N. as far as the Pacific, and passing southwards to the United States boundary, over all the territory west of the 115th meridian.

The Algonquins are distributed over the remainder of British North America, with the exception of a comparatively small portion held by the Huron-Iroquois family on their reserves at the Grand River, between Lakes Ontario and Erie, and on the St. Lawrence River at Caughnawaga, and at the Lake of the Two Mountains. Those who lately entered Canada in the neighbourhood of the Souris River, known as the Sioux, are now returning to the United States.

The Algonquins have always been the largest tribe in British North America, and still occupy the most extensive area. This was also the case in the United States, but the American Indians are being gradually forced westward towards the head-waters of the Missouri

and the spurs of the Rocky Mountains. Many, however, have retired before the whites to the plains of the North-West Territories.

The respective numbers of these four divisions are estimated thus :—

Eskimos, or Innoits	4,000
Dénè-Dinjiè	42,000
Algonquins, or Algie	46,028
Huron-Iroquois	10,330
	102,358

And their territorial divisions thus :—

Province of Prince Edward Island	323
,, Nova Scotia	1,666
,, New Brunswick	1,403
,, Quebec	6,988
,, Ontario	12,978
,, Manitoba	500
,, British Columbia (estimated)	23,000
,, Rupert's Land ,,	33,500
Labrador and Arctic Watershed	22,000
	102,358
Or, East of the Rocky Mountains	76,358
West ,, ,,	26,000
	102,358

As compared with area :—

		Superficies in Square Miles.
Newfoundland	none	42,000
Prince Edward Island (Census, 1871)	323	2,100
Nova Scotia ,,	1,666	21,731
New Brunswick ,,	1,403	27,322
Province of Quebec ,,	6,988	193,355
,, Ontario ,,	12,978	107,780
,, Manitoba (Census, 1870)	500	14,000
,, British Columbia	23,000	356,000
Labrador, Rupert's Land, and the North-West	55,500	2,465,712
Islands in Arctic Ocean and in Hudson Bay		310,000
	102,358	3,540,000

As regards mode of living :—

By fishing, say	23,000
In camps and by prairie hunting . . .	18,000
In villages in settled districts . . .	17,350
In families in the woods	44,000
	102,350

Whether the aborigines have increased or not since the occupation of North America by the whites is a debatable question. Judging from the estimates made in 1736, and the immigration from the United States to Central Canada, it is probable that they are now as numerous as ever in Canada; but that they have decreased in the United States and its territories cannot be doubted.

The Eskimos or Innoits are supposed to be a migratory tribe, who about the beginning of the tenth century passed from the arctic coasts of the Asiatic continent to those of the American continent by Bering Strait on the west, or Greenland on the east. They differ in language and appearance from the other aboriginal tribes, who resemble the Mongolians, or more particularly the Japanese, in appearance and customs.

The language of these last tribes appears to have been derived from a common source, and they must have held communication among themselves, as cowry shells, which are only found in the south, are in general use among the northern tribes. They have no knowledge, however, of the temple-builders of Central America, whose terraced temples correspond in form with those which are found encircling the world about the line of the tropics.

Teak canoes, such as were made by the South Sea Islanders, have been found embedded in the sands of the Pacific shore of Southern California.

It is difficult, however, to trace their origin, and although many of their customs as to the burial of the

dead and the observance of seasons correspond with those of Eastern nations, still their mats made of rushes, and their bark boxes ornamented with porcupine quills, in imitation of plaited straw, and sometimes with straw itself, resemble, in material, style, colour, and pattern, the work of the Japanese.

As with other nations, there is much difference between the tribes, according to location and occupation; but the free air and warlike habits of the prairie Indian make him one of nature's noblemen. Brave, intelligent, courteous, dignified, an orator in council, faithful in friendship, fierce in war, using stratagem to overcome an enemy, patient, stoical, and scorning death when himself overcome, he chaunts his "war song" under the most cruel tortures, and dies, as he lived, untamed and unsubdued.

The Huron-Iroquois, although classed together, have waged incessant war with each other until, from being the most powerful of the tribes, they are now the weakest in numbers, the Huron branch having been almost exterminated by their brethren, and the Iroquois much reduced in numbers.

The Hurons originally occupied the northern shores of Lake Huron, and of the Ottawa and St. Lawrence rivers as far east as Quebec.

The Iroquois occupied a broad extent of territory to the south of Lakes Erie and Ontario, and to the south of the St. Lawrence as far east as the Richelieu or Iroquois River, and had established a confederation known as the "Five Nations." Their history is beautifully told by Parkman, who has contributed so much to the early history of Canada. This confederation played an important part in the English and French occupation of this continent—at war first with the one and then with the other, and courted alternately by each. Led by Brandt

they made a desolation of Wyoming, as sung by Campbell in his "Gertrude of Wyoming":—

> "Accursed Brandt! he left of all my tribe
> Nor man, nor child, nor thing of living birth."

Carrying at other times the tomahawk into the homes of the French, massacring them incessantly, so that around the villages, as the settler, gun in hand, sowed his seed, the Iroquois often reaped his scalp;—hunting their kinsmen, the Hurons, the allies of the French, from Detroit to Quebec, and destroying the last of their bands under the very walls of that citadel;—such were the Iroquois in war.

The rallying of the tribes by Pontiac, to avail themselves of the antagonism between the French and the English and drive them both from the continent, was a piece of statecraft worthy of "advanced civilisation."

This confederation of the Iroquois is supposed to have been the model of the United States confederation, and in its latest application of the Canadian one. The last of the Huron chiefs died at Lorette village, near Quebec, a few years since. The names of Tecumseh and Brandt will ever be associated with the heroic age in Canadian history. The remnants of this Indian nation in the older provinces are engaged in agriculture, or act as *voyageurs* and pilots. Many of them are being amalgamated with the French inhabitants of the province of Quebec. A band of Sioux, of this same tribe, sought refuge in Canada, after the Minnesota massacre, in 1862, and a second band under "Sitting Bull" after the destruction of "Custer's command," in 1877, but most of this band have lately returned to the United States.

The enmity of the Indians in the United States to the Americans is natural, as they consider themselves deprived of their lands and their means of support, and unfairly used under the treaties made with them.

When Canada had to deal with the quieting of the Indian tribes to the North-West Territories, the difficulties in the way were apparent.

Here was the last refuge of the Indian on the continent. Under any circumstances, treaty-making with the warlike tribes of the prairies would have been a delicate matter, but this difficulty was increased by the experience of the American tribes, who had carried their evil report of the white man north of the international boundary.

Whilst Canada was desirous of having these territories opened to the settler, she was not prepared to run the risk of a conflict which would certainly have been a serious one, and might have impeded for an indefinite time the occupation of the North-West Territories of Canada by the "white man."

Treaties were, however, made for the transfer of the Indian title to the whole of these territories, which treaties appear not only just but politic, and afford good grounds for belief that the bargain will be equally advantageous to both parties.

It is a satisfaction to be enabled to say that the Indians' faith in the British Government is unbounded, and has paved the way for the treaties with Canada. From an account given by the Hon. Alexander Morris, who acted as the Commissioner for the Government in the negotiation of the most important and difficult of those treaties,[1] we gather the following facts:—

Since 1870 no less than seven treaties have been made with the aborigines in Canada; but three treaties must be first mentioned as preliminary to the late ones.

1. That of Lord Selkirk in 1811, whereby he purchased the Indian title to the tract of land acquired

[1] *Treaties of Canada with the Indians of the North-West.* Hon. Alexander Morris, P.C. Toronto. 1880.

by him from the Hudson Bay Company, for the purposes of settlement.

2. The treaty of 1850 for certain portions of the shores of Lakes Huron and Superior, where rich deposits of copper had been found; and

3. The treaty of 1862 for the Great Manitoulin Island on Lake Huron.

The late treaties by the Dominion may be summarised thus:—

1. A relinquishment to Canada in all the great region from Lake Superior to the foot of the Rocky Mountains, of all the Indian right and title to the lands covered by the treaties, saving certain reservations of land for the exclusive use of the Indians; and

2. In return for such relinquishment, permission to the Indians to hunt over the ceded territory, and to fish in the waters thereof, except such portions thereof as should pass from the Crown into the occupation of individuals or otherwise.

3. The annual payment in perpetuity of $5 per head to each Indian man, woman, and child; $25 to each chief; and $15 to each councillor.

4. The allotment of lands to small bands instead of to tribes, each family of five persons receiving 640 acres to be held by them, and only sold with the consent of the band.

5. The gift of fishing nets, agricultural instruments, seed, grain, and oxen and cattle to form the nucleus of herds.

In the negotiation of these treaties the Indians exhibited much intelligence, good judgment, and tact, and displayed wonderful oratorical powers. They have a childlike reverence for their great "mother over the water," and point with pride to the medals received by their forefathers from her grandfather George III.

A little incident which occurred at the Qu'Appelle Treaty will exemplify this. It must be borne in mind that an Indian treaty is not lightly broken by the Indian, and that he is not inclined to sign a bond until every stipulation is complete. The terms of the treaty had been settled, the bond was ready for execution, but the money stipulated "to be paid down" was not in hand, and in the midst of the prairie was not to be had. The chiefs hesitated, but the commissioner, Governor Morris, was equal to the occasion, and extending his hand, said, "See the money in this open hand which I extend to you." The treaty was signed.

The future of the Indian depends on the possibility of a gradual civilisation without demoralisation. The bison, their mainstay for food, is being rapidly exterminated, and they will have to adopt the habits of the white man to secure the means of sustenance. The object of the Government is to induce them to adopt an agricultural or pastoral life, and to educate their children. This they are eager to do, and already give good earnest of their sincerity. As they are prone to the abuse of alcohol, every precaution is taken to keep "fire-water" out of the land; schools are provided, agricultural colleges established, the tilling of the soil encouraged, and even justice secured to all. As far as possible they are not treated as a distinct class, but as citizens of the Dominion.

They are under the superintendance of the Minister of the Interior, who is the Superintendent-General of Indian affairs, and as such has the charge and care of their lands and property. There are about fifty schools for Indian children established in the Dominion, principally in the provinces of Ontario and Quebec. Some of the teachers are paid out of the Indian Fund; others are supported by various societies. The number of pupils is about two thousand.

In the annual report of the Department of the Interior for 1876 the following encouraging statement is made by the Minister of this Department as to the condition of the Indians in the Manitoba and the North-West superintendencies: "The moral and material condition of the Indians in the North-West has been steadily and surely progressing since the North-West Territories were included within the Dominion. The liquor law and the Mounted Police Force have together succeeded in stamping out almost entirely the vice of drunkenness. Crime is comparatively rare. The irritation and distrust which existed in certain localities, or among particular bands of Indians, have been replaced by an almost universal feeling of contentment, and of gratitude to the Government for its liberality and benevolence."

The interesting question of the care of the Indian is attracting much attention, and there are philanthropists and statesman in the United States who join with those in Canada in hopefulness for the result.

In this meeting of the eastern and western peoples in the Dominion of Canada, let us hope that the subjects of our noble Queen will recognise a brotherhood with the "untutored Indian," and that so long as "the sun shines and the rivers flow," the faith pledged between them will be maintained.

2. *Indian Missions.*

The Moravian Missions—Government.—The Moravians, who first attempted to settle amongst the Eskimos in 1752, founded the station of Nain (56·30 N. lat.) in 1771, and that of Okkak, north of it, in 1776. In the same year the first "medicine man" was baptized.

In 1782 was founded Hopedale, the southernmost—in 1838 Hebron, the northernmost—of their stations; and lastly, in 1866, Zoar, between Nain and Hopedale. But

there would seem to be still some unbaptized Eskimos even in Hopedale. The Christian Eskimos conform to the practices of the Moravian community, and are content and grateful for the teachers residing in their midst. Although their conduct may still fall far short of the evangelical precepts, there is nevertheless a great difference between these converted Eskimos and those in the north, who have not yet adopted the Christian religion.

3. *Games.*

The Indians are much addicted to gambling, which they practise generally in a game with small pieces or sticks of wood. This vice leads them, through their impulsive nature, to stake everything they possess, and rather than desist they will part with goods, horses, wives, children, and even their own liberty.

Without describing their sports generally, it may be allowed here to introduce a description of their favourite game of Lacrosse, now adopted as the national game of Canada, and attracting much attention abroad.

The following account of the game is from the pen of a gentleman connected with the Hudson Bay Company, who has lived a lifetime among the Indians of the North-West:—

"I first had the pleasure of seeing the game of Lacrosse played at Fort William, on Lake Superior, in the summers of 1820 and 1821, perhaps in both. It was a favourite pastime amongst the 'Sautteux;' that is the general French name of the natives in that quarter of the country and around the north shore of Lake Superior, and as far westward as Lake Winnipeg. The Indians themselves style their nation the Ojibiweyuk, including the tribes immediately south of the Crees, or Killisthenaux, who are of cognate extraction and speak a

language of similar derivation, but differing in dialect. In the time of the North-West Company, Fort William, like 'La Grande Portage,' was a summer rendezvous of the Ojibiweyuk. At the time referred to we had Indian families camped around us coming from their wintering grounds, close to Fond du Lac, others from the Black and Nipigon Bays, and bands from up the Current River towards the Dog Portage, as far as Mille Lacs. These again had connection with the Ojibiweyuk of Rainy Lake, where the old Sachem, or head of the tribes, was wont to hold his court in former times, amidst the united bands, from the Vermilion and Red Lakes to the sources of the Albany River. It may be said, then, that I saw the pure Ojibiweyuk at their favourite pastime of Lacrosse.

"I have ever considered the game, as I saw it then played, as peculiar to the Ojibbeway and Cree tribes, and natives from the same stock. I have understood that it was played at Isle à la Crosse, in English River, a part of the north possessed by the great Cree nation, after they had driven the Chipewyans (quite a different people) back to the Peace River. Lac Isle à la Crosse must have got its name from the first Canadians who passed under Frobisher having seen the game played there.

"I have never heard of the game being played north of the Crees, nor did I ever see it played on the waters of the Columbia, or at any of the great gatherings of Indians west of the Rocky Mountains. Foot races among men, as well as horse racing, were the principal and absorbing sports there. The Sohauptues and Kayuses were always occupied with these, as well as the Spokans, Kullespelins, and Flatheads, whenever they met together, whether it might be between individuals or in a more extended way between the tribes. The unfriendly terms on which the above-mentioned races were with the numerous Shoshonees or Snake nation prevented any intercourse with them.

The latter were kept to their lands on the southern tributaries of the south branch of the Columbia. As for the Indians of the 'prairies' proper—say, the Sioux and their various bands, and the Blackfeet, Piegans, Gros Ventres, etc.—I cannot speak definitely as to their not having the game among them, for I know but little about them; but I have never heard it mentioned in the travels of any one, nor spoken of by those who have sojourned amongst them. And I may say the same of the nations south of the Missouri, the Pawnees, Cheyennes, and Recarees, and others. Should it be found that any of these prairie tribes possess, or ever possessed, the game of Lacrosse, it would still be a difficult matter to prove whether it had originated with them or with the eastern nations.

"The crosse used at Fort William by the Ojibbeways was different in shape from the one usually played with at Fort William. The stick was of the length of a long walking cane, the wood thinned off at the end until it could be turned to an exact circle, or small hoop *slightly* larger than the ball. Across this round little hoop were tied two small pieces of whip-cord sufficiently loose to form a bag wherein the ball rested, but not deep enough to allow it to sink far in below the middle, but so as to keep it easy for delivery, or the casting of it. The ball when in the air may be sometimes caught in the hoop, and if on the ground has to be lifted up by the hoop being placed over it and a quick turn of the wrist. The principal difficulty appeared to me to consist in keeping the ball within the cup *in running*, and the throwing of it straight where required. The crosse had to be held obliquely, high in the air, to keep the ball uppermost by a bend of the wrist. Then in running, at each step the arm had to be moved backward and forward by the action of both shoulder and elbow, so that the ball might not

jump out. Even when running alone this was not easily prevented, but when the other lacrosse sticks were rattling about, the possessor of the ball had a most difficult task to keep it. The slightest touch might unship the ball. Every opponent had to be dodged in some mode or other, however marvellous, that being the safest game. In delivering the ball to another from the cup, or throwing it to the goal, it was necessary to discharge it with a jerk or check that it might leave the hoop freely and in the direction wanted.

"You will perceive that with the cup lacrosse, as with the raquette, a great amount of agility is necessary to play the game well; but in the matter of stopping the ball in the air, or catching it in the cup, as is sometimes done, great exactness of eye and expertness are called for. This and the projecting the ball freely and straight constitute the most skilful play. I had seen much of cricket, football, and hockey in my day, but I can safely say that I have never witnessed such elasticity and elegant exertion of body and limbs in men as I saw in these pure Ojibbeways at their favourite pastime. As regards the rules or regulations amongst the Indians in playing the game I can say nothing.

"I was quite new to the Indian country, and could not speak the language, and left Fort William for the interior, after my second summer there. Any differences or quarrels over the game I cannot recall. I believe there were none. On such occasions of amusement the Indians met each other for enjoyment, and probably on that account their passions were laid still. Many of them had families, with whom a quarrel at such a time would have been all loss and no gain. Besides, quarrels for them were very *serious things*, and when they did occur, unhappily, were frequently settled with the gun abroad, or the knife or tomahawk if in the camp. This

of course would tend to keep them gentlemen in their light sports, and I must say I do not remember to have seen any *rough* treatment of each other, or foul play at lacrosse amongst these children of the forest."

From this interesting statement it may be inferred that the game of lacrosse is peculiar to the Ojibbeway or Algonquin and Iroquois Indians (to whom may be added the Hurons).

Whether this game is of native origin or has been derived from the ancestors of the American Indian cannot be stated. Catlin in his valuable work on the American Indian does not mention the game. It is distinctive from "hockey" and "golf," both Celtic games, and to which it bears some resemblance, inasmuch as the ball is picked up and carried with the *crosse*. Some one has well remarked that the physical and mental characteristics of a people may be inferred from their games and ballads. In this game, where running, throwing, catching, and dodging are developed, it is indicative of a system of life peculiar to a race of hunters and skirmishers whose occupations were the chase and war.

This game is well suited for outdoor exercise, and is likely to prove an excellent means for training skirmishers to act in concert or independently.

4. *The Métis or Mixed Races.*

The power of France in North America has passed away, but the memory of its *régime* still endures throughout the vast territories discovered and colonised by the hardy Canadian pioneers, with the blood, language, and character of a large proportion of its inhabitants.

Always the friends of the Indians, the French explorers, traders, and *voyageurs* often became identified with their interests and fortunes, and freely intermixed with

them. Their mixed blood descendants, found mostly north and west of the great lakes, scattered throughout the British possessions and the North-Western States, have been in their humble way playing an important part in the colonisation and civilisation of the Far West. Sailing down the Red River of the north into the province of Manitoba, the traveller finds himself at their head-quarters. He observes men and women with almost the dusky complexion of the aborigine, but dressed in a civilised garb. They speak a French dialect readily understood, but unlike any of the *patois* of France. He is surprised at their demonstrativeness and pleased with their urbanity. He discovers in them the instincts of the Indian blended with and modified by many of the moral and mental traits of the white, so that he is often unable to tell which blood predominates. (V. Havard, M.D., U.S.A., Smithsonian Report, 1879.)

Their origin is easily traced to the hardy race of French Canadian fur traders, canoe men, and adventurers of the seventeenth century, who found a vent for their restless activity, and freedom from the restraints of civilised life, among the native tribes, with whom they naturally intermixed by marriage. The contrast is noticeable between the French and English colonies in their relations with the Indians, that the latter, independent of the Indians, from whose watercourse they could derive no benefit, regarded them as an obstacle to their progress—a natural foe, against whom they waged a war of extermination; whilst the former, from the first, recognised in the red man a fellow-being, and as such entitled to consideration, and whom they treated with firmness tempered by strict justice. As the result of their intercourse with the Indians, there was not in New France a single tribe whose alliance and friendship they did not win and retain even long after their power had passed away. The example

set by the French in Canada has been followed by the English since the conquest, with like satisfactory results.

The offspring of this union of the races is styled *métis*, traceable through the Spanish *mestizo* to the Latin *mixtus*. Sometimes the term *bois-brûlé* (burnt wood), from their dusky colour, is applied to them. The majority of this class are from an admixture with the French *voyageurs* or *coureurs de bois*, but in Manitoba a small proportion are traceable by their names to Scotch fathers, probably some of the Earl of Selkirk's colonists.

They are intelligent and industrious, and engage in handicraft as well as agriculture, but are fond of the excitement of the chase. They combine many of the faculties of both white and Indian, and still form a distinct class of the population. They are kind-hearted, genial, and sympathetic, practising hospitality, and are generous to a fault. They may be said to have a clear sense of morality, but a weakness in will, and to be fickle and impulsive, generally preferring pleasure to duty, and thus unable to resist temptation. The amount of illegitimacy and crime among them is, however, less in proportion than in most civilised countries.

Their language consists generally of one or more of the Indian dialects, to which they add English and a French *patois*, with a large admixture of obsolete French words and some words expressive of local ideas or objects.

In physique they are of middle stature, well proportioned, with dark complexions, and are, like the Indians, beardless.

The Earl of Dufferin, on his visit to Manitoba in 1877, paid a just and appreciative tribute to the *métis* for their conduct in the transfer of the North-West Territories to Canada, in the following eloquent remarks:—

"There is no doubt that a great deal of the good feeling thus subsisting between the red men and ourselves

is due to the influence and interposition of that invaluable class of men, the half-breed settlers and pioneers of Manitoba, who, combining as they do the hardihood, the endurance, and love of enterprise generated by the strain of Indian blood within their veins, with the civilisation, the instruction, and the intellectual power derived from their fathers, have preached the gospel of peace, and good-will, and mutual respect, with equally beneficent results to the Indian chieftain in his lodge and to the British settler in the shanty. They have been the ambassadors between the east and the west; the interpreters of civilisation and its exigencies to the dwellers on the prairie, as well as the exponents to the white men of the consideration justly due to the susceptibilities, the sensitive self-respect, the prejudices, the innate craving for justice, of the Indian race. In fact, they have done for the colony what otherwise would have been left unaccomplished, and have introduced between the white population and the red man a traditional feeling of amity and friendship, which but for them it might have been impossible to establish."

INDIAN WIGWAM.

CHAPTER XIII.

IMMIGRATION AND SETTLEMENT.

THESE subjects are among the most vital which have to be considered in the policy of a new country, and it is generally felt that their importance as regards the Dominion extends to the empire of which it forms a part. This is so ably stated by Sir Alexander Galt, the High Commissioner for the Dominion, in his late address before the Colonial Institute, London, that we shall quote some of his remarks:—

"What, it may be asked, is the true interest of Great Britain in the future of her greatest colony? Is it not true that, while portions of the same empire, all that belongs to Canada belongs equally to England—the vast forests, the boundless fertile prairies, the mineral wealth of Canada? Are they not the common heritage of every British subject — differently administered, but yet the same? Has England no interest in the prolific fisheries on the coasts of her American possessions, and should she not feel how largely her naval strength may be augmented from the thousands of hardy fishermen who earn a precarious livelihood on the stormy shores of Newfoundland and Nova Scotia? Should she not desire to share in establishing a new route to India, Australia, and China through her own possessions, free from all risk of interruption by foreign hostilities? I might answer one and all of these questions affirmatively, by saying that her

interest is truly an imperial one; that by the possession and speedy development of Canada, England most surely maintains her power, and widens and strengthens her influence. But in these days Imperialism is at a discount; strangely enough, I find in many quarters that the material interests of the mother country are supposed to be more connected with foreign nations than with her own colonies; and I must try to find within the admitted necessities of Great Britain and Ireland some reason which shall supply an adequate motive for her aiding Canada in the great work that has been devolved upon her by British statesmen. The reason is to be found in the over-population of the United Kingdom, and in the absolute necessity of providing against the evils—ever increasing and daily becoming more threatening—which are traceable to this cause. Emigration, continuous, progressive, and systematic, is the only certain remedy, and forms, at the same time, the only boon Canada asks from the mother country. Rarely, indeed, can any remedial measure be applied which does not involve some painful sacrifices on one side, or perhaps on both; but here the blessing will rest both with the giver and the receiver.

"The returns show the singular circumstance that until 1841 the actual emigration to British North America was absolutely larger year by year than to the United States. After 1841 two causes operated to turn the flow of emigration more largely to the United States: the first was the condition of Ireland up to and succeeding the famine, the other was the contemporaneous opening up of the vast prairie States of the Union, which began to attract general notice after 1840. The latter cause was, I think, much the more important, and to it, I believe, the United States are indebted for the rapid strides they have made in population and wealth, and the great attraction they have offered to the emigrating class of the

United Kingdom, of Germany, and of Scandinavia. If I am correct in this view, the Dominion of Canada may well look forward with great confidence to the effect to be produced by the speedy opening up of the North-West Territory—a district probably quite as extensive as the prairie region of the Union, and certainly as well fitted for the maintenance of a large population. My conviction therefore is, that the tide of emigration which turned so strongly after 1840 to the United States will soon resume its former direction to British North America, as, other material advantages being equal, I cannot think a British subject would prefer a Republican form of government to that happy blending of freedom and law which he can enjoy under his own flag.

"Were the question only that of relieving the congestion of population in the United Kingdom, it would certainly be immaterial where the emigrant went, provided he went at all. But beyond this point arises the most important inquiry of—How can the exodus be made serviceable to the mother country in other respects? to which the reply is manifest: As consumers of the products of British labour at home. I might instance the Australian colonies, which offer an infinitely stronger illustration; but as I may be told that their distance forbids their being chosen by the mass of poorer emigrants, I will take Canada and the United States, whose conditions are in many respects equal as fields for emigration, and it will be seen by the Board of Trade returns that on an average of the last three years, every person, and therefore every emigrant, in the United States has consumed only 8s. 4d. worth of British manufactures, while in Canada he has consumed 32s.; it is therefore in the interest of British labour at home, in the proportion of 32 to 8, that emigration should go to Canada rather than to the United States."

Emigration may be reasonably regarded as the easiest and cheapest means of relief from communism and pauperism, which are making headway in consequence of the overcrowding and necessities of the people, and possibly a large number of persons who are dependent on parish aid might in a new country, where circumstances favour their advancement, become producers instead of paupers.

At present the evils of pauperism are continued from generation to generation by the "poor-rates," whereas the children certainly, and many who have become demoralised from want of hope, would in a new field develop their energies.

The effort is being made by a few philanthropists to rescue the children of the poor, as shown in the following statement of the number of immigrants, chiefly children, brought to Canada under the auspices of charitable societies and individuals during the last five years :—

1876	303
1877	430
1878	384
1879	478
1880	672
Total	2267

These children all do well, but it is for some statesman who realises the importance of this great social and political question to lay it before the Parliament of Britain, and to crown with utility and philanthropy the colonial policy of the Empire by a judicious and systematic aid to colonial settlement.

At one of the debates of the Royal Colonial Institute, Mr. Labilliere essayed to put a financial value on the loss which the British Empire had sustained during the last fifty years by emigration to the United States. Taking the statement of Sir Alexander Galt, that in the time mentioned not less than 4,000,000 of people had

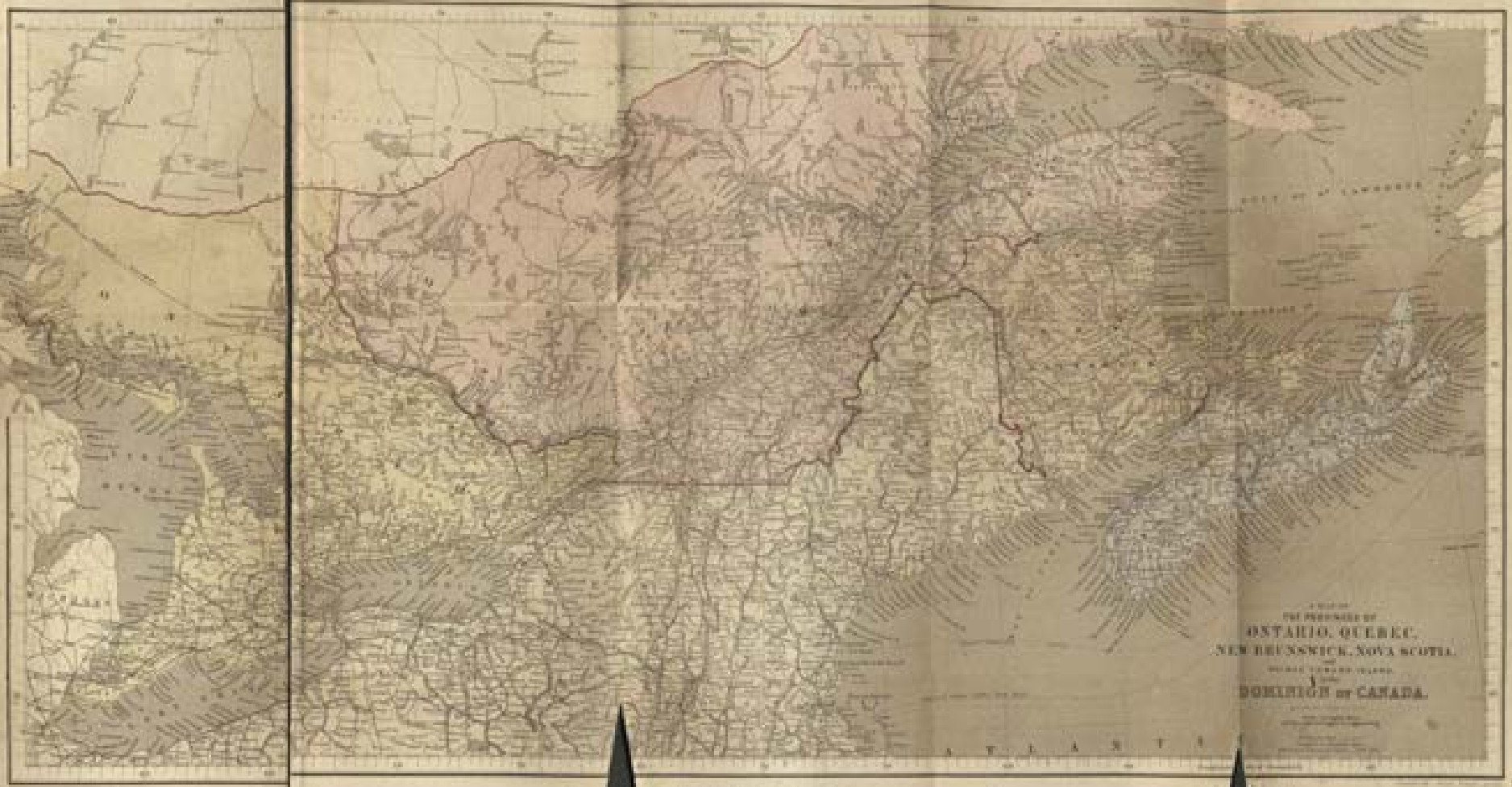
transferred their homes and allegiance from the United Kingdom to the American Republic, as the basis of his computation, and valuing the average healthy industrious emigrant (on the authority of an American publication) at £166 : 13 : 4, he reckoned that England had virtually made a gift of £666,666,666 : 13 : 4 to the United States. The reflection which he made on this result was, that if the population referred to had been diverted to the British colonies, the latter would be to-day in a very different position. There is no doubt that British statesmen are beginning to look at the question of emigration from the same standpoint.

The total number of acres sold and taken up from the acquisition of the North-West Territories, etc., to the 31st October 1880 is as follows:—

Homesteads	Acres	1,819,456
Pre-emptions	,,	1,007,104
Sales (scrip and cash)	,,	922,515
Total	,	3,749,075

For which there has been paid:—

Homesteads	$113,716 00	
Pre-emptions	12,908 00	
Sales (cash)	125,153 50	
Do. (scrip)	570,670 34	
		$822,447 84
Receipts	$251,777 50	
Hereafter to be received	356,761 23	
	$608,538 73	


ONTARIO, QUEBEC,
NEW BRUNSWICK, NOVA SCOTIA,
DOMINION OF CANADA.

HALIFAX (NOVA SCOTIA).

To face page 581.

CHAPTER XIV.

CITIES OF THE DOMINION.

1. *Halifax (Nova Scotia).*

HALIFAX, the capital of Nova Scotia, and the Atlantic seaport of the Dominion, is situated in latitude 44° 39′ 42″ north, 63° 35′ 30″ west longitude, on the west side of Chebucto Bay, usually called Halifax Harbour. The harbour itself is 6 miles long by about a mile wide, and is connected by a narrow arm with Bedford Basin, an inner harbour 6 miles long by 4 miles wide. No harbour in the world is more accessible, more capacious, or better suited for shipping. The entrance to this harbour and the city are protected by eleven separate fortifications, and here is the great North American naval station of Great Britain, and the only part now occupied by British troops in Canada. At the north end of the city is a large dockyard for the repair of ships of war. It covers 14 acres, and is the finest dockyard in Canada. In rear of the city a hill 250 feet high is crowned by a citadel, which stands second only to Quebec for strength.

Opposite to the southern extremity of the city is the well-fortified George's Island. Halifax was settled under Lord Cornwallis in 1749, and here the Duke of Kent, who was much attached to the place, resided for some time. The city stands on high land, and the scenery around is very picturesque. Many villas are scattered about the outskirts and on the shores of an inlet of the

sea, about three miles long by half a mile wide, known as the north-west arm. Halifax is an old-fashioned city, and the people, until awakened from colonial quiescence by confederation, the building of the Intercolonial railroad, and the utilisation of their grand seaport, confined their attention chiefly to the fisheries, to trade with the West Indies, and to the gaieties of a naval station. Now they are developing the immense coal deposits of the province, the beds of iron, the rich gold-fields, and the inexhaustible fisheries of the adjacent seas. As the terminal point of the transatlantic system of railways and the eastern seaport of the Dominion, as well as the centre of the vast coal and mineral resources of Nova Scotia, Halifax, independently of the European and North American trade naturally attracted here, cannot fail to become one of the most important seaports on the continent, and a great manufacturing city.

This result would be accelerated were the people to realise the importance of exertion in availing themselves of their great natural advantages, and not allow trade to be diverted from them into other channels artificially created by enterprise and skill. Under all "Sam Slick's" humour lay this patriotic advice to his countrymen, "Wake up, and avail yourself of your advantages."

Halifax is essentially English in its style, and is a charming place of residence. On the east side of the harbour is situated the town of Dartmouth, settled in 1750.

2. *Fredricton* (*New Brunswick*).

Fredricton, a city and port of entry of New Brunswick, and the capital of the province, is situated on the west side of the river St. John, 60 miles in a direct line N.N.W. of St. John, lat. 45° 55′, long. 66° 31′ 30″. This St. John River is three-quarters of a mile in width here, and

is navigable for vessels of 120 tons, but small steamers ascend to Woodstock, 65 miles further up the river; or, during high water, to Grand Falls, 75 miles above Woodstock. It has railway connection with the United States railways, and with the intercolonial railway companies of Canada.

It is a pleasantly situated city, well built, and has a university, a very beautiful Episcopalian cathedral, and, as the seat of government, Parliament Buildings. It is the see of the Episcopalian bishop, the present metropolitan of the old provinces of Canada and the Atlantic provinces. Population, 6000.

3. *St. John* (*New Brunswick*).

St. John, a city and seaport of New Brunswick, and the commercial metropolis of the province, is situated on a high rocky peninsula at the mouth of the St. John River, which enters into the Bay of Fundy. It is in lat. 45° 14′ 6″ N., long. 66° 3′ 30″ W; 190 miles N.W. of Halifax *viâ* Annapolis, or 276 *viâ* the Intercolonial Railway, and 370 miles due east of Montreal. The tides of the Bay of Fundy here rise 27 feet, and cause a reversible cascade in the river about a mile and a half above the city according to the level of the tide. It is the great shipbuilding and shipowning city of the province, and is the rival of Halifax in the fisheries and in the West India and foreign trade. It is subject to fogs at certain seasons of the year, but is otherwise easily approached, and has a safe and commodious port. The city is well built, and presents a striking appearance from the river mouth.

It is connected by railway with the United States and the Dominion, and is a prosperous city. In 1876 it was almost entirely destroyed by fire, but has been since rebuilt, and in an improved style.

It was visited by Champlain in 1604, when it was occupied by the Indians under the name of Ouangondy. The French established settlements in 1635, and after several vicissitudes of fortune, it fell to England under the Protectorate in 1654, but was restored by the treaty of Breda in 1749. The French were again driven out of it in 1754, but the city was not actually settled by the English until 1783. Population, 26,128.

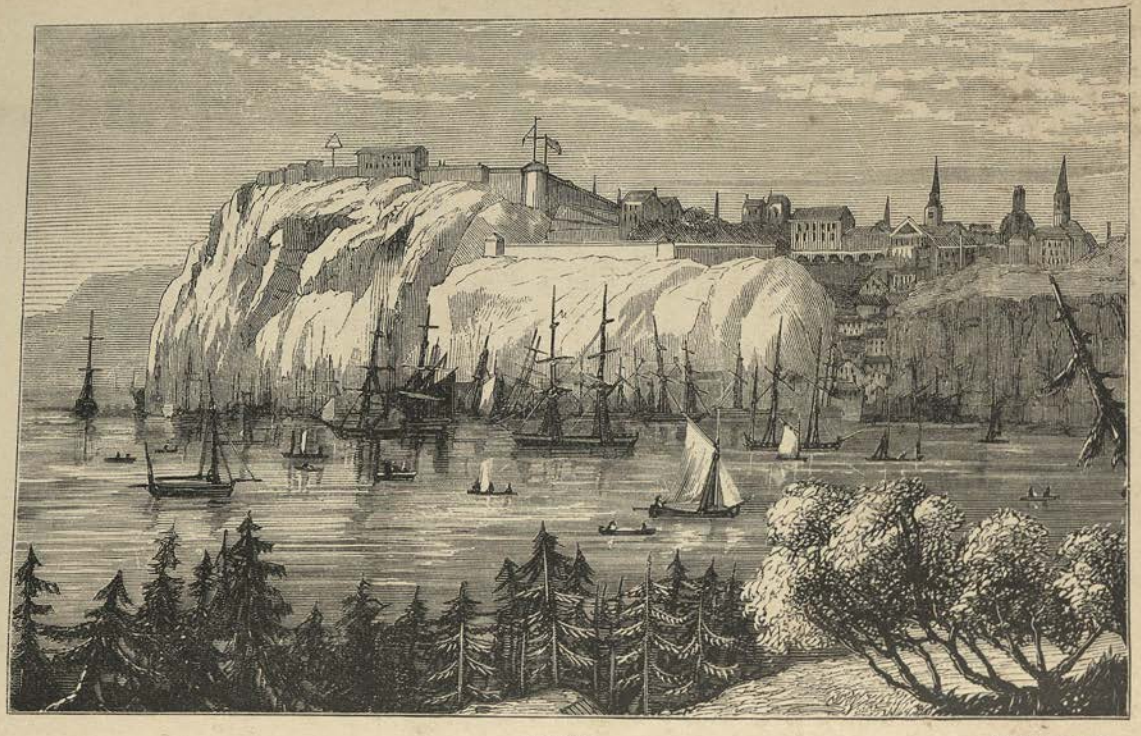
4. *Charlottetown (Prince Edward Island).*

Charlottetown, the capital of Prince Edward Island, is well situated on the Hillsborough River, near the southern coast, 46° 15′ north lat., 63° 11′ west long. It is well built on a gently-rising ground, and has a population of 10,000. The island is fertile and well settled, and now enjoys the advantages of a railway running from one end of the island to the other as a backbone to the narrow stretch of land on either side.

The island is named after H.R.H. Edward, Duke of Kent, and Charlottetown after H.R.H. the Princess Charlotte.

No more beautiful island can be found in the St. Lawrence estuary. The climate is delightful, and with the facilities for bathing on its sandy beaches, and of yachting in its waters, attracts a large number of visitors, who easily reach it by rail to Pictou or Shediac, and thence to Charlottetown by steamer. Here the merchants and citizens dispense their hospitality so pleasantly in the old English style that the charms of the place are intensified by the charms of the society.

The island is well cultivated, and the oyster beds of the estuary are famous; whilst the fisheries, shipbuilding, and general commerce engage the attention of the people and render them prosperous and contented.



QUEBEC.

To face page 585.

5. *Quebec (Quebec).*

This historic city of Canada, with which the names of Wolfe and Montcalm will ever be associated, stands with its towering citadel as the sentinel in charge of the entrance to the St. Lawrence. When the French mariners first approached it they exclaimed "*Quel bec!*" (What a cliff!), from whence the present name of the city has been adopted. This cape, now known as Cape Diamond, forms the extremity of a tableland, with a precipitous face of 333 feet in height, and is surrounded by the fortifications of Quebec, by the upper town, and in rear by the celebrated Plains of Abraham. Under the cliff is a narrow strip of land gradually extended by wharves, on which flat is the lower town. In front is the river St. Lawrence, narrowed between the Cape of Quebec and the high shores of Point Levi to 1314 yards.

Below the city enters the small river of the St. Charles, gliding through a beautiful valley, in rear of the high tableland, and eastward lie the gentle slopes of the Beauport shores, and the noble lake-like basin apparently barred at the lower end by the large island of Orleans.

This city has a population of 62,447, chiefly French, who glory in this their ancient capital, and feel at home when attending the legislature of their native province in their now British provincial capital.

It is almost impossible to avoid a feeling that you are in Normandy when visiting Quebec; and from its European characteristics, picturesque beauties, fortifications, French population, and Norman style of architecture, it attracts the attention of all visitors, who do not find its parallel for quaintness on the continent of America.

The fortifications cover an area of about forty acres, and several squares adorn the city. Immediately below the main bastion is the artificial terrace overhanging the

cliff and the harbour. This terrace was commenced by Lord Durham and completed by Lord Dufferin. Several monuments mark the histories of the great battlefield by which the Dominion of Canada fell from France to Britain. These are in the upper town, whilst in the lower town the timber merchant has his office, and along the river on either side are coves for receiving and overhauling large logs of squared timber, and in the roadstead ride large timber ships ready to receive their freight, and occasionally a vessel of war resting on a peaceful cruise, or paying a friendly visit.

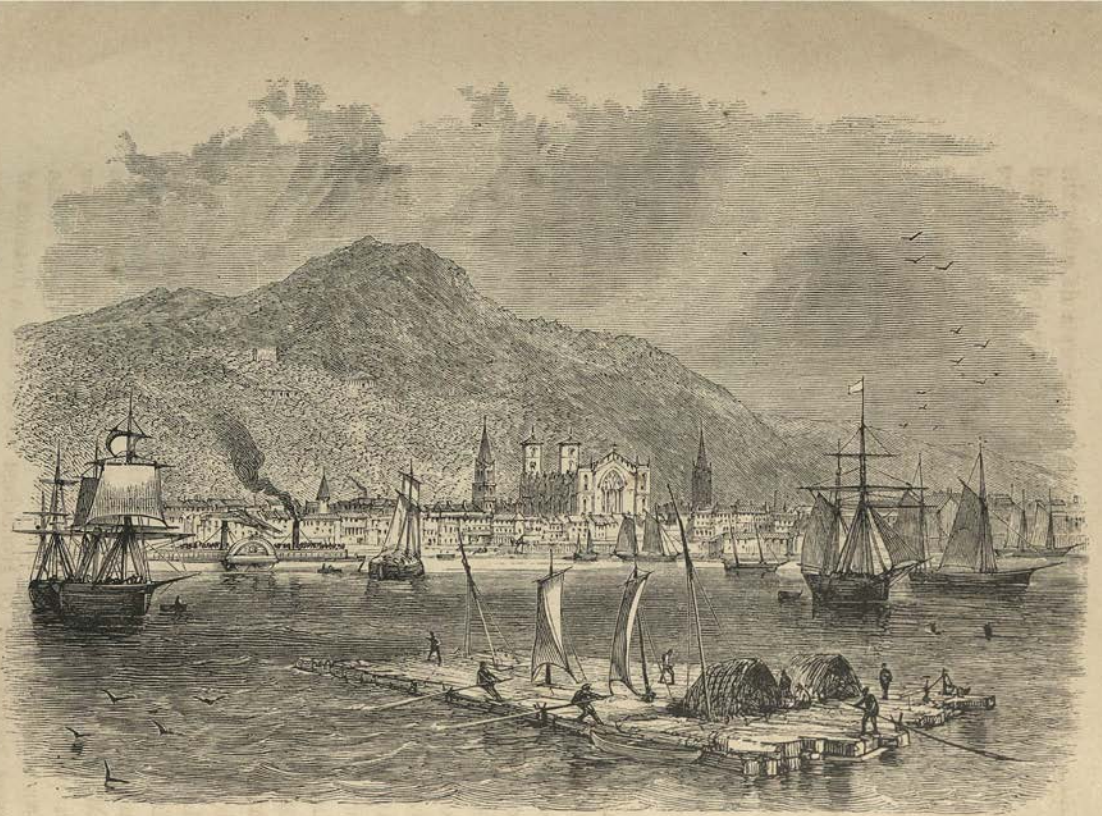
Quebec, named by the Indians "Stadacona," was first visited by Cartier in 1535. The city was founded by Champlain in 1608. In 1629 it fell into the hands of the English under Keith, but was restored in 1632 with the rest of Canada. In 1690 an English attack failed, but in 1759 it was conquered by Wolfe. In 1775 the Americans under Montgomery failed in their attack, and lost their brave leader.

It is not the seaport of the St. Lawrence, nor is it commercially a progressive city, although its position is favourable and its citizens not wanting in enterprise. Possibly the new railway lines with which it is identifying itself, and the industries,—specially in the manufacture of beetroot sugar,—as well as the introduction of French capital, may stimulate them to advance more rapidly.

Meanwhile, Canada without its Quebec would be incomplete, and the French Canadians without a home.

Quebec is the see of the Roman Catholic archbishops, and the chief French University, namely that of Laval, is in this city.

If the English population of Canada excel in scientific and practical work, the French distinguish themselves in literature, in the professions, and in music



MONTREAL.

To face page 587

now as they did in chivalry and in explorations under the French *régime;* and Quebec is the centre around which the associations of the past circle and the representatives of the old *noblesse* delight to congregate.

As a city where hospitality is dispensed by the hand of beauty, Quebec stands unrivalled in America.

Quebec is in lat. 46° 49′ N., long. 71° 13′ 45″ W., is 200 miles from the mouth of the St. Lawrence at Point des Monts, 180 miles N.E. of Montreal, and 328 miles N.N.W. of Portland.

6. *Montreal (Quebec).*

Montreal, the chief city in the province of Quebec, and the present commercial and financial centre of the Dominion, with its population of 140,682, is the largest and most attractive city in Canada. It is situated in lat. 45° 31′ N., long. 73° 34′ W., on the southern shore of the island of the same name, at the junction of ocean and river navigation, and is the summer seaport of the vast inland system of the St. Lawrence river and lakes. It is 620 miles from the Atlantic Ocean, 180 miles south-west of Quebec, 320 due north of New York, and has extensive railway connections with the whole Dominion of Canada and with the United States. The island of Montreal is a beautiful and fertile island 32 miles long by 8 to 10 miles wide, lying at the confluence of the St. Lawrence and Ottawa rivers; and the city, whether seen from the river front, where the St. Lawrence is about 2 miles wide, or from the park covering the heights of Mount Royal, about 2 miles back from the river, has a picturesque and imposing appearance. The harbour stretches from the entrance of the Lachine Canal at the west, to the town of Hochelaga on the east, a distance of about 3 miles, and is lined by a raised roadway or terrace

fronted with a parapet of masonry, and backed by warehouses. Behind this roadway the city is built on a succession of gently-rising terraces, surmounted immediately in rear by the wooded heights of Mount Royal, 726 feet above the level of the river St. Lawrence. The buildings are imposing, and with their material of grey marble and tinned roofs give a striking character to this Canadian city. It is well paved, and very generally ornamented with trees. An aqueduct of 7 miles in length from the rapids of Lachine provides by gravitation an unlimited supply of pure water. Gas and electricity are used to secure light, and the telegraph and telephone, with all the ordinary city appliances, are generally adopted. The harbour is under the control of a Board of Commissioners, and every facility is afforded to the ever-increasing shipping which lines the wharf. Access is afforded to the south shore by the Victoria Bridge, and extensive improvements are projected, one by a tunnel under the river bed, another by a combined roadway and dam from the city to St. Helen's Island, as well as by a railway bridge immediately above the city for the Atlantic and North-Western Railway, and a third bridge across the foot of St. Helen's Island, just below the city.

Montreal is chiefly devoted to commerce and manufactures, but one cannot fail to notice the number and massiveness of its public buildings, and the elegance of the private ones. The population is a mixed one of French and English, the former being the more numerous, but the latter possessing more wealth, and generally controlling both trade and manufactures. It is a favourite resort for both summer and winter tourists, and each season affords special attractions. The social and educational advantages the city affords, combined with good and cheap markets, make it a favourite place of residence; while the climate is delightful, and the four winter

months, from December to March inclusive, have charms which strangers appreciate after having lived in the country.

The history of Montreal dates from 1535, when Jacques Cartier first landed on its shores and gave the name it so worthily bears of "Mount Royal." The Indians of the Huron tribe here had their chief village and rendezvous, to which they gave the name of Hochelaga, and relics of this ancient race are still occasionally disturbed in the excavations in the neighbourhood of the mountain. The way to the Indian village was through large fields of Indian corn (maize). Its outline was circular; and it was encompassed by three separate rows of palisades, or rather picket fences, one within the other, well secured and put together. A single entrance was left in this rude fortification, but guarded with pikes and stakes, and every precaution was taken against siege or attack. The cabins or lodges of the inhabitants, about fifty in number, were constructed in the form of a tunnel, each 50 feet in length by 15 in breadth. They were formed of wood covered with bark. Above the doors of these houses, as well as along the outer rows of palisades, ran a gallery ascended by ladders, where stones and other missiles were laid ready for the defence of the place. Each house contained several chambers, and the whole was so arranged as to enclose an open courtyard, where fire was made. It first began to be settled by Europeans in 1542, and exactly one century afterwards the spot destined for the city was consecrated with due solemnities, and called "Ville Marie," a name which it retained for a long period. In 1760 it was taken by the English. At this time it was a well-peopled town, of an oblong form, surrounded by a wall flanked with eleven redoubts, a ditch about 8 feet deep and a proportionate width, but dry, and a fort and citadel, the batteries of which com-

manded the streets of the town from one end to the other. The town was at this time divided into an upper and a lower town, the upper town being on the level of the present court-house. In the lower town the merchants and men of business generally resided, and here were situated the royal magazines, the armoury, and the nunnery hospital. In the upper town were the principal buildings, such as the palace of the Governor, the houses of the chief officers, the convent of the Recollets, the Jesuits' Church and Seminary, the Free School, and the Parish Church. The houses were solidly constructed in that semi-monastic style peculiar to Rouen, Caen, and other towns in Normandy. Early in the present century vessels of more than 300 tons could not ascend to Montreal, and its foreign trade was carried on by small brigs and barges. In 1809 the first steam-vessel, *The Accommodation*, built by the Hon. John Molson, made a trip to Quebec; she had berths for about twenty passengers. Years of industry, intelligence, enterprise, and labour, have produced a mighty contrast. Ocean steamers of 6000 tons, and ships from 700 to 2000 tons, from all parts of the world, and innumerable steamers and river-craft, now lie alongside the wharves of the harbour, which are not equalled on this continent in point of extent, accommodation, approach, and cleanliness. In 1832 the cholera raged in Montreal with great violence, carrying off 1843 inhabitants in a population of little more than 30,000. In April 1848 a political mob burned the Parliamentary buildings, which were situated on the site of the present St. Ann's Market, and the seat of government was in consequence removed to Kingston, and then, by alternation, to Quebec and Toronto, and finally to Ottawa. In July 1852 a destructive fire laid waste a large part of the city, burning 1108 houses, and destroying property valued at $1,363,264. In 1860

the city was visited by the Prince of Wales, in 1862 by the Duke of Edinburgh, and in 1869 Prince Arthur made it his residence for several months. The Hôtel-Dieu was founded in 1644 by Madame de Bouillon, and six years afterwards the Convent of Notre Dame was founded by Mademoiselle Marguerite de Bourgeois.

The island of Montreal, originally granted *in fief* by the King of France to the company of the *Cent Associés*, was restored to the Crown, and in 1633 was conferred on the Order of St. Sulpice of Paris, who established a branch in Montreal. After the conquest this local branch claimed the right of representation of the parent society. This claim was objected to, and it was not until 1840 that an ordinance was passed confirming their claim, but at the same time providing for the gradual extinction of this seignorial burden. Subsequent legislation has been adopted for the early and complete extinction of the feudal system, but the Seminary of St. Sulpice by this grant has become a very wealthy corporation in the city of Montreal.

The two oldest churches in Montreal are the Bonsecours (Roman Catholic) and St. Gabriel (Church of Scotland). The former was erected in 1658, was burnt in 1764, but rebuilt in 1771; the latter was built in 1792. Montreal is surrounded by villages, whose population numbers over 40,000.

Montreal is the see of the Anglican as well as of the Roman Catholic bishops of Montreal. The English cathedral here is one of the finest specimens of church architecture on the continent.

As Montreal merchants were the pioneers in steamship and railway enterprise in Canada, so are they still the leaders in industrial progress and commercial extension, both home and foreign. With much conservatism, they nevertheless anticipate, initiate, and make liberal

provision for utilising and maintaining the natural facilities which their position affords; and they fully appreciate the fact that trade established in a certain route continues naturally therein. It will not be their fault if in commercial rivalry with their sister cities they do not make great additions to their present trade, and render this city of the Dominion of Canada what New York is to the United States—its financial centre and commercial capital for all time to come. It is now becoming as much the centre of the vast system of railway traffic for the Dominion and with the United States, as it is the seaport of the Dominion.

7. *Ottawa* (*Ontario*).

Ottawa, in the province of Ontario, and the capital of the Dominion of Canada, was in 1858, on the reference of the parliament of the old province of Canada, elected by Her Majesty the Queen as the seat of government, and under the Confederation Act has been continued as the Dominion capital.

It is beautifully situated on the right or southern bank of the Ottawa, here 150 feet above the river, and at the confluence of the Rideau and Ottawa rivers. It is immediately below the falls of the Chaudière, once beautiful in a state of nature, but now surrounded and almost hidden by immense saw-mills and timber slides, which indicate the industrial character of the population, and the extent of the timber trade, but certainly mar the aesthetic appearance of this once picturesque cascade.

The city has a population of 27,417, which is rapidly increasing, not only on account of its industrial advantages as the great *entrepôt* of the timber trade, but also by reason of the attractions of a capital, with its representative of the Crown, its ministers, statesmen, and

departmental bureaux, all occupied in the management and organisation of a vast country. Again, the Dominion Parliament Library, the Geological and Natural History Survey Museum, and the Art Academy, are special attractions in making Ottawa a literary, scientific, and art centre.

During the war of 1812 with the United States, it was found that gunboats were exposed on their way through the St. Lawrence to the great lakes, between the point where the international boundary strikes the St. Lawrence River near Cornwall and Kingston at the entrance to Lake Ontario. To obviate this, Colonel By, an officer of the Royal Engineers, planned the route by the Ottawa River, across the peninsula, using the Rideau River and a succession of lakes to Kingston. This route was adopted, the Rideau Canal with its succession of locks was constructed, and in 1827 a commencement was made under the name of Bytown, of the present city, which was changed in 1854 to Ottawa.

The Houses of Parliament, by their prominent location, size, and architectural beauty, necessarily constitute a striking object in the appearance of this city. They stand on the old "Barrack Hill," overlooking the river Ottawa, and cover, with the ornamental grounds surrounding them, about 25 acres. The foundation stone was laid by H.R.H. the Prince of Wales in 1860. The style is Italian Gothic. The main building 500 feet long, and the two departmental buildings each 375 feet in length, form an open parallelogram, in rear of which stands a beautiful semi-detached octagonal library building. The several erections cover 4 acres, cost $4,000,000, and are specimens of modern architecture which would do credit to any country. In fact it would be difficult to indicate any other recent structure of which the general effect is more harmonious or striking.

Ottawa is a curious example of transformation from a lumberman's shanty to a beautiful city, and this within a space of fifty years.

Ottawa is in lat. 45° 25′ 59″ N., long. 75° 42′ 4″ W., and 126 miles W.N.W. of Montreal, 95 miles N.N.E. of Kingston, and 450 miles from New York. The town of New Edinburgh forms a suburb of the city, lying about two miles to the east of it, and is the centre of attraction in a social point of view, as at the Government House, now occupied by the Governor-General, the Marquis of Lorne, and H.R.H. the Princess Louise, is dispensed royal hospitality, coupled with a fostering care of art and literature, and crowned, as is the home of their royal mother, by a noble Christian example.

> "It needs no royalty to hedge her round
> Who stands supreme in woman's grace."

8. *Kingston (Ontario).*

Kingston, a city of Ontario, at one time the capital of Upper Canada, situated at the outlet of Lake Ontario, 172 miles west of Montreal, lat. 44° 12′ N., long. 76° 41′ W. The city occupies the site of the old Fort Frontenac on the north-east shore of the river (opposite Wolfe Island), which here enters the lake. The west shore is bold, and shipping of any size may lie here in perfect safety. East of the bay the land projects southward, terminating in Point Frederick, or Navy Island, beyond which is Haldimand Cove, a deep basin of water protected by this point on the west, and Point Henry on the east, and guarded from southerly winds by Wolfe Island in front. Kingston is, after Quebec and Halifax, the strongest fort in the Dominion of Canada. There is a fort on Missessaga Point, and all other accessible points are secured by batteries. There are extensive military works on Navy

Point, and on Point Henry is a fortress which completely commands the harbour and town. A long bridge across Cataraqui Bay connects Kingston with Pittsburg, besides which there are the suburbs of Barriefield French village and Williamsville. The city is regularly laid out with streets crossing each other at right angles. It is chiefly built of blue limestone, which underlies the town. The streets are lighted with gas, and the houses are partly supplied with water. The Rideau Canal, connecting this port with the Ottawa River, has made Kingston a place of considerable commercial importance.

A settlement was begun here by the French, by De Courcelles, as early as 1672, under the name of Fort Cataraqui, and the fort subsequently received the name of Fort Frontenac in honour of the French count of that name. This fort was afterwards in the possession of the French and the Indians, until it was destroyed by the expedition under Colonel Bradstrut in 1758. In 1762 the place fell into the hands of the British, from whom it received its present name. It was incorporated as a city in 1838. Population (Census 1881), 14,093.

Kingston is a see of the Anglican and Roman Catholic bishops.

A military college, adopting an organisation and curriculum similar to Woolwich, and under the direction of officers of the British service, has been established here for the purpose of training officers to take charge of the public works of Canada, and protect them if necessary with military defences. There are now about 100 cadets, to whom four prizes are annually offered of commissions in the British army. The other cadets who graduate are much sought for as civil engineers.

It was at this place that La Salle built the first vessel for the navigation of the lakes. It was, however, lost on its first trip.

9. *Toronto* (*Ontario*).

Toronto, formerly York, is the capital of the Province of Ontario, and the leading commercial city of Western Canada. It is situated on Lake Ontario, behind a sand-bar which affords shelter to a large and safe harbour, and is in latitude 43° 49′ 4″ N., longitude 79° 31′ 5″ W., 333 miles W.S.W. of Montreal, 161 miles from Kingston, 39 miles N. by E. from Hamilton, and 500 miles N.W. of Washington. Its proximity to the waters of the great lakes renders the climate here milder than in Montreal. The mean temperature of the year is 44° 4′; winter 26° 4′, summer 63° 8′ Fahrenheit.

The bay is entered by a narrow opening, and is separated from the lake by a low peninsula, about 6 miles long, flanking a bay one mile and a half across. The site of the town is low, but rises gently from the water's edge, the observatory being 108 feet above the level of the lake. The streets are wide, and are laid out very regularly. The buildings are substantially built, chiefly of white brick; and many of them, particularly the public ones, are of very good architectural design.

There are several well-built common schools and grammar schools. In connection with higher education there is the University of Toronto, one of the finest buildings on the continent of America, and reckoned second to none on this side of the Atlantic as a seat of learning. It is of Norman architecture, with a massive tower and richly-sculptured doorway for its main entrance. It is beautifully situated at the western side of the Queen's Park—a noble public park for the recreation of the citizens, whose spacious avenues are ornamented with rows of stately trees. There is a monument erected here in honour of those Toronto volunteers who fell in defence of their country during the first attempted invasion of

Canada by the Fenians in 1866. Trinity College is another educational institution, in connection with the Episcopalian Church; and there is also Knox College for the theological training of students in connection with the Canada Presbyterian Church. The Upper Canada College is an extensive range of buildings, and has a high repute as a grammar school and boarding school for boys. There are two schools of medicine, each having its staff of professors. There is also an ably-conducted Veterinary College.

Toronto was founded by Governor Simcoe in 1794. Parliamentary buildings were erected, and the Legislature assembled there for the first time in 1797. In 1813 it was captured by the Americans under General Pike, who was killed in storming the fort; but it was held only for a few days. Since that period the city has made steady progress, and has assumed considerable importance as a mart of trade and commerce. In 1834 it was incorporated as a city, and its name changed from York to Toronto. Population (Census 1881), 86,445. Toronto is a see both of Anglican and Roman Catholic bishops of Toronto.

Toronto has increased in population more rapidly than any of the older cities of Canada, and had in 1871 but 56,092. This progress is due mainly to the rich agricultural country by which it is surrounded, the railway facilities it affords, the shipping by the lake ports to and from the United States, and the enterprise of its citizens and merchants.

The citizens of Toronto are not admirers of their French brethren in the Province of Quebec, and are perhaps somewhat inclined to provincialism. They are extending their railways to tap the great North-West Territories, and hope to become the commercial centre of the Dominion.

Whatever be the relative progress of the city as compared with others, it is certain to be deservedly great; and its educational facilities, the pride of the English population, are bearing their fruits in the rapid advance of the whole province of Ontario, and the consequent importance of Toronto as its natural centre.

10. *Winnipeg* (*Manitoba*).

Winnipeg, or Fort Garry, the seat of government of the Province of Manitoba, is situated at the junction of the Assiniboine with the Red River, in latitude 49° 55′ north, longitude 97° 8′ west.

It is 40 miles south of the lake of the same name, 65 miles north of Pembina, the frontier town of the United States on the Red River, and 1180 miles north-west of Montreal, *vid* the Canadian Pacific Railway, but 1843 miles by the United States route.

It is the representative city of Central Canada, and of the great North-West, and has sprung suddenly into existence, resembling in this respect Chicago and San Francisco in the United States, and Melbourne in Australia. Prior to 1870 it was an important post and the headquarters of the Hudson Bay Company, where the Governor, Sir George Simpson, had been accustomed to summon an annual council of the officers of the Company.

At that time it had a population of about 300 souls, many of whom were descendants of the early settlers under the Earl of Selkirk, and many were half-breeds. All trade was then monopolised by the Hudson Bay Company; from hence the hunter started on his buffalo hunt, and to this point he returned to enjoy the gaieties of society.

Within the last six years, owing to the knowledge of the resources of the country, and to improved facilities of

access through the United States, it has increased to 15,000; but as railway connection is now completed with the older provinces of Canada, and an immigration and land fever is raging, it is quite probable that it will double its present population within twelve months.

What gold was to California and Australia, wheat is to Manitoba; the harvests of the latter, however, attracting a class of settlers superior to the former, and affording more certain and satisfactory returns.

Of this new and vast field for enterprise, in which failure is not dreamt of, Winnipeg is the centre of attraction and radiation. The Canadian Pacific Railway here crosses the Red River, and the latter river, as well as the Assiniboine, drain the golden harvests gathered over wide stretches of territory. Moreover, branch railways and radiating lines are being rapidly built, and more are projected. Even the trade by the Great Northern or Hudson Strait route is sought to be attracted here by a railway to Churchill. The construction of all these railways, and particularly of the great transcontinental road, leads to large disbursements of money, and every one here is busy in making his fortune, if not his "home."

The Anglican and Roman Catholic missionaries had wisely established churches, schools, and colleges, and now under the direction of a joint board Winnipeg possesses in the University of Manitoba a well-managed and well-attended university, with the Most Reverend Robert Machray, the metropolitan of Rupert's Land, as Chancellor. The city also enjoys municipal institutions, civic government, and legislative halls, like the older capitals.

Winnipeg is situated on a "dead level" prairie on the left bank of the Red River, which river, as well as the Assiniboine, has eroded broad but ditch-like gulleys through the alluvial plain.

The prospects from the city are extensive, but far

from picturesque. The streets are wide and long, and may be extended indefinitely. The first houses were all built of wood. The new ones are of stone, or chiefly brick, for which the clays in the neighbourhood afford abundant material. Some of these buildings are of superior style, and building operations, considerable though they be, fail to supply the wants of the people.

By the time that the present excessive stimulus given by railway construction has abated, Winnipeg will be fully established as the commercial centre of the villages, towns, and cities springing up all over this vast country, and will doubtless even then maintain its supremacy.

Such at least is the belief of the people, and this faith materially helps to secure the anticipated result.

11. *Victoria* (*British Columbia*).

Victoria, the seat of government and capital of British Columbia, is situated near the south-east extremity of Vancouver Island, where the adjoining strait of Juan de Fuca is 17 miles in breadth. It is 143 miles from Olympia (Puget Sound), 320 miles from Portland (Oregon), and 3000 miles from Montreal. Latitude 48° 25′ 20″ north, longitude 123° 22′ 34″ west.

The surroundings of Victoria are singularly beautiful. To the south is a wide stretch of sea closed by the magnificent range of the Olympian Mountains. To the eastward is Mount Baker, which at a distance of nearly 100 miles rears its snowy peak amidst the clouds. To the westward is a wide stretch of sea, bounded on one side by the Olympian range, and on the other by the mountains of Vancouver; whilst to the north are ranges of hills and mountains, prominent amongst which, and within five or six miles of the town, are the peaks of Mount Tolmie and Cedar Mountain. From these heights the most beautiful

panoramic views of the southern end of the island, the surrounding ocean, the Olympian Range, and the coast range on the mainland, far away to the westward, may be obtained.

The country in the neighbourhood of Victoria is remarkably picturesque, with its parks of aged oaks, its inlets, bays, and beaches, and groves filled with a profusion of roses, ferns, and wild flowers. The climate resembles that of the south of England, being clear, cool, and fresh during the summer, and mild in the winter.

Three miles from Victoria is the harbour of Esquimault, one of the finest on the Pacific coast. Here is the Pacific station of North America for the British Navy, with a graving dock capable of admitting vessels of the largest size.

The city boasts of some good streets, with fine drives over excellent roads, in various directions. Adjoining the town a large extent of ground has been reserved for a public park. This picturesque locality, known as Beacon Hill, borders on the strait. Here is the public racecourse and cricket ground. On the outskirts of the town are many attractive residences, and every cottage displays its pretty garden. There is very little of the past to record of this youthful city, as it was not until the capital had been removed here from New Westminster that it became the chief city of British Columbia.

Nova Scotia was said to be somewhere "east of sunrise," and British Columbia "west of sunset." The Canadian Pacific road will, however, soon link these distant provinces; and as Halifax will represent the one on the Atlantic, so Victoria will represent the other on the Pacific, and this city will doubtless have a future and satisfactory history when the rail-car shall traverse the continent, and the steam-ship lines now being prepared shall carry the merchandise of the East to its wharves.

12. *New Westminster (British Columbia).*

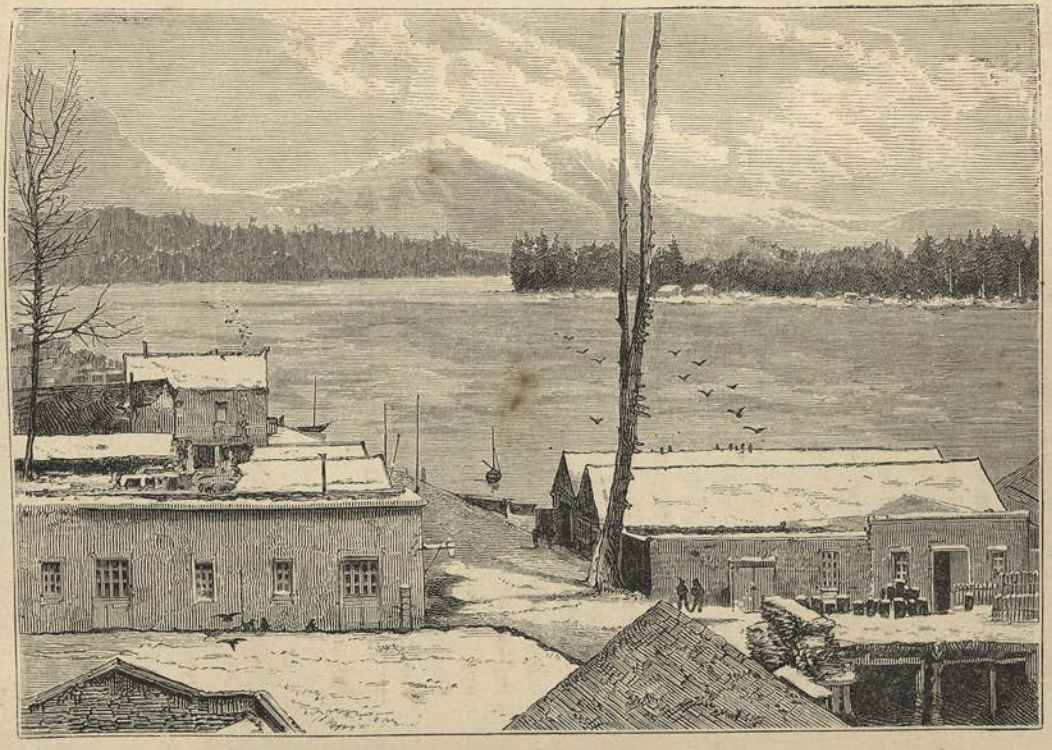
New Westminster, the former capital of British Columbia, is beautifully situated on the north bank of the Fraser River, 75 miles from Victoria. Latitude 49° 12′ 47″, longitude 122° 53′ west. At present the principal industry is salmon-fishing. Salmon, sturgeon of fabulous size, trout, and other kinds of fish, are caught in great abundance. New Westminster, when the capital, was a prosperous and busy place; since the removal of the seat of government to Victoria it has materially decreased in business and population, but nothing can deprive it of its magnificent site, and of its fine climate and scenery. The steamers from Vancouver Island make it their forwarding station for all passengers and freight from abroad; and the river steamers their headquarters whence they convey passengers and freight to Yale, 100 miles distant, the head of navigation on the Fraser River, and supply the demands of the whole of the interior. Burrard Inlet, one of the finest harbours on the Pacific coast, and the proposed terminus of the Canadian Pacific Railway, is only a few miles from New Westminster. Population, 4000.

TABULAR STATEMENT OF THE POPULATION OF PRINCIPAL CITIES.

CENSUS 1881.

Province of New Brunswick—		Province of Quebec—	
St. John	26,128	Three Rivers	9,296
[1]Fredricton	6,218	Levis	7,597
Province of Nova Scotia—		Sherbrooke	7,227
[1]Halifax	36,102	Hull	6,890
Province of Prince Edward Island—		St. Henri	6,415
[1]Charlottetown	11,485	Sorel	5,792
Summerside	2,853	St. Hyacinthe	5,314
Province of Quebec—		Province of Ontario—	
Montreal	140,682	[1]Toronto	86,445
[1]Quebec	62,447	Hamilton	35,965

[1] Provincial Capital.



NEW WESTMINSTER (BRITISH COLUMBIA).

To face page 602

Province of Ontario—	
[1]Ottawa . . .	27,417
London . . .	19,763
Kingston . . .	14,093
Guelph . . .	9,880
St. Catherine's . .	9,642
Brantford . . .	9,626
Belleville . . .	9,516
St. Thomas . .	8,370
Stratford . . .	8,240
Brockville . .	7,608
Chatham . . .	7,881
Peterboro' . . .	6,815
Windsor . . .	6,567
Province of Ontario—	
Port Hope . .	5,588
Woodstock . .	5,373
Galt	5,189
Lindsay . . .	5,081
Province of Manitoba—	
[2]Winnipeg . . .	7,985
Emerson . . .	1,500
Province of British Columbia—	
[2]Victoria (Vancouver) .	5,925
New Westminster .	4,000
Province of Newfoundland—	
St. John . . .	23,890

[1] Dominion Capital.

[2] Provincial Capital.

CHAPTER XV.

CONSTITUTIONAL HISTORY, RELIGION, EDUCATION, ETC.

1. *General Outline.*

A REVIEW of the early history of Canada, and of the French *régime*, is almost necessary to an understanding of its constitutional history.

No one who studies the early progress of this country can fail to remark the weak attempts at colonisation, and the trials and vicissitudes through which the first settlements passed. At the date of what may be called the beginning of European settlement on the territory now occupied by the Dominion, these efforts, feebly sustained by the parent States, were impeded by the wars in which these nations, as well as the colonists themselves, were constantly engaged.

Spain having led the way in the discovery of a New World, and excited the envy and rivalry of the other nations of Europe, England hastened to secure her share in the new territory, and planted colonies in Newfoundland and on the shores of the present New England and Virginia sections of the United States. Holland also established settlements in the New Netherlands, at the mouth of the Hudson. France, equally eager, and professing like zeal with Spain for the conversion of the heathen to Christianity, landed her colonists in Acadia, and whilst her intrepid missionaries baptized the astonished Indians,

explorations were pushed westward, trade with the natives established, and New France occupied.

The territorial claims of the colonising nations were extensive but uncertain from want of geographical knowledge. They were, however, so comprehensive that the Indians inquired what portion of the continent had been reserved for them.

These European claims, broadly stated, were—Mexico, Florida, and Louisiana by Spain; the New Netherlands by Holland; the Atlantic coast between Acadia and Florida (the New Netherlands excepted) by England, as well as the Hudson Bay territories; and New France, from the Arctic Ocean to the Gulf of Mexico and westward to the Mississippi, by France. This boundary to the west was limited rather by geographical ignorance than otherwise.

The discoveries and settlements specially affecting Canada are as follows:—

In 1497 the Cabots, then in the service of Henry VII. of England, reached North America, and landed on a coast they named Prima Vista, supposed to have been either Newfoundland or Nova Scotia. This was several months before Columbus landed on the shores of the continent. In 1535 Cartier entered the St. Lawrence and ascended the river to the site of the present city of Montreal. He is supposed to have first adopted the name of Canada, having mistaken the meaning of the Iroquois word "Kanata" (a collection of huts), and assumed that it was the Indian name of the country. In 1542 Roberval attempted a settlement at Cap Rouge, near Quebec, and in 1583 Sir Humphrey Gilbert tried to found a colony at St. John's, Newfoundland, while Chauvin in 1599 endeavoured to establish a settlement at Tadousac. All these efforts failed, and the first permanent settlements made were those of the French in

1605 at Port Royal in Acadia, and at Quebec in 1608, and the English settlement at St. John's, Newfoundland, in 1613.

Constant wars were waged between the French colonists of New France, as Canada was then called, and the English colonists of New England.

Quebec was taken by Kertk in 1629. Louisbourg was captured for the second time in 1758, and although the greater part of Canada was actually wrested from the French by the English more than once, prior to its final capture in 1759, it was always restored to France. Pending the struggles, a deportation of about 6000 Acadians took place from Acadia to the several English colonies to the south. These French colonists would neither take the oath of allegiance to England nor observe the duties of neutrals, and in spite of the sentiment in their favour, which has obtained poetical expression in the pleasing fiction of "Evangeline," their expulsion from the country was a political necessity. Parkman, in his charming history of the French *régime*, gives an account of the weak support afforded the French colony by the parent State, the conflict in authority between the military and civil heads of the State, the struggle for supremacy between the Recollet and the Jesuit missionaries, the severity of the laws, the restrictions on trade, the burdens of the feudal tenure, and the military service which constant wars entailed on the people, so that the treaty of Paris, which in 1763 transferred New France to England, really enfranchised a burdened but chivalrous people.

By the terms of the capitulation, the French colonists were guaranteed the free exercise of their religion, subject to the supremacy of the Crown, but the civil and criminal laws of England were introduced.

The British military administration lasted from 1759 to 1763.

From 1763 to 1774 the government of all the settled parts of Canada, then styled Quebec, was by a governor and council appointed by the Crown.

In 1774 the British Parliament passed what is known as the Quebec Bill.

The spirit of the Act may be summarised thus—

It confirmed to the Roman Catholics the freest religious liberty, and restored the old civil laws of the French *régime.*

It deprived the people of trial by jury in civil cases, as well as of the right to Habeas Corpus, and shut the door to local parliaments.

As the colonists, both English and French, desired a House of Assembly, the Bill was highly distasteful to all, and its baneful effect in giving cause for distrust to the British colonies to the south of Canada afterwards culminated in the independence of the United States of America.

The appeal of the revolted American colonists in 1774 to the Canadians was unsuccessful, as well as their attempted conquest of Canada in 1775, which attempt only failed of success by the defeat of Montgomery in front of the walls of Quebec.

In the American Revolution the distinction was strongly marked between the descendants of the Puritans, who were inclined to republicanism, and those of the Cavaliers, inclined to monarchy. This led many of the latter to side with the British arms, for which they suffered at the end of the war in the confiscation of their properties; and some 40,000 persons, including disbanded soldiers, sought refuge in Canada and Nova Scotia. These loyalists were well received, and provision made for them in lands and moneys.

Many of them settled in Nova Scotia and in the eastern townships adjoining the American frontier, but the majority of them went westward to Ontario.

These refugees have been since distinguished as "U.E. loyalists," and politically their descendants are still staunch conservatives.

In 1784 New Brunswick was separated from Nova Scotia, and erected into a distinct province by a special constitutional charter.

In 1785 the law of Habeas Corpus was irregularly introduced into Canada.

In 1791 the Constitutional Act 31 Geo. III., cap. 3, was passed, making more effectual provision for the government of the Province of Quebec.

The most important provisions to be noticed are as follows:—

1. The Provincial Council was abolished.

2. The then Province of Quebec was divided into Upper and Lower Canada.

3. A legislature, composed of a Legislative Council and an Assembly for each province, was authorised.

4. All persons of 21 years of age and over, holding lands of the annual value of forty shillings or upwards, not ecclesiastics or priests, were eligible for election.

5. Provision was made for the support of a Protestant clergy in each province, and the accustomed dues and rights with respect to such persons only as should profess the Roman Catholic religion were confirmed to the Church of Rome.

6. All lands to be thereafter granted in Upper Canada were to be in free and common soccage, the seignorial tenure and the French civil law according to the *coutume de Paris* being restricted to Lower Canada.

7. The taxing power was renounced by the Imperial Parliament, except only in cases where it might be expedient to impose the same for the regulation of commerce.

8. The Habeas Corpus Act was indirectly confirmed.

It may be remarked here that at the second session of the Parliament of Upper Canada in 1793 an Act was passed suppressing negro slavery. No Act was passed in Lower Canada, but Chief-Justice Osgoode declared "negro slavery to be at variance with the law of the country." A continual struggle prevailed under this system of government between the executive councils appointed by the Government, and the legislative assemblies elected by the people, each striving for supremacy. In 1837 this struggle culminated in a rebellion of a section of people, both in Upper and in Lower Canada. The Imperial Government suspended the constitution, and authorised the appointment by the Governor-General of a special council. The rebellion having been easily repressed, an Act was passed, known as the "Union Act," reuniting the Provinces of Upper and Lower Canada under the name of the Province of Canada, and conferring a free constitution and responsible government.

In 1854 the seignorial tenure in Lower Canada was abolished.

In 1859 the statutory law of Canada was consolidated, and that of the old province of Lower Canada revised, preparatory to its codification in 1866.

The foresight of Fox had anticipated the difficulties which were afterwards experienced through the separation of the provinces, namely, an antagonism between the English and French sections of the people; and Pitt likewise had foreshadowed the dead-lock in the government of the country by a united assembly, composed of the same parties when evenly balanced. Both these forecasts having been verified, the question arose how to overcome these difficulties.

The history of the development of confederation is so well stated in the *Year Book* of 1868, that we again avail ourselves of its contents.

A federal union of the British North American Provinces was first vaguely foreshadowed in 1784, at the time of the separation of Nova Scotia and New Brunswick. It was looked upon then by practical men as a far-off possibility, and had been suggested, doubtless, as a counterpoise to the newly-established federation of the United States. Such a scheme has since from time to time been advocated by some of our ablest colonial statesmen. A proposal is recorded as having been made by the Hon. R. J. Uniacke, of Nova Scotia, who, about the year 1800, brought colonial union under the notice of the Imperial authorities. In 1814 the late Chief-Justice Sewell, of Quebec (who enjoyed the friendship of the Duke of Kent, father of Her Majesty the Queen), addressed to His Royal Highness a letter on the subject of a union, strongly recommending it—a document to which allusion is made by Lord Durham in his Report on the Affairs of the British North American Provinces. In 1822 Sir John Beverly Robinson, at the request of the Colonial Office, submitted a scheme of a similar nature.

In Lord Durham's celebrated Report on Canada and British North America generally, his lordship laid great stress upon the absolute necessity of a federal union, and expressed his gratification upon "finding the leading minds of the various colonies strongly and generally inclined to a scheme that would elevate their countries into something like a national existence."

In reference to the influence of the United States as hemming us in on every side, he observes:—"If we wish to prevent the extension of this influence, it can only be done by raising up for the North American colonist some nationality of his own, by elevating these small and unimportant communities into a society having some objects of a national importance, and by thus giving their in-

habitants a country which they will be unwilling to see absorbed even into one more powerful. A union for common defence against foreign enemies is the natural bond of connection that holds together the great communities of the world, and between no parts of any kingdom or state is the necessity for such a union more obvious than between the whole of these colonies."

Colonial jealousies and dissensions prevented the accomplishment of Lord Durham's recommendations at that time, but there is no doubt that this Report was the means of preparing the public mind for the adoption of a measure similar in many respects to that proposed by his lordship.

In 1854 the question was discussed in the Nova Scotia Parliament, the Hon. Messrs. Johnston and Howe, the leaders of the rival parties, vying with each other in their advocacy of a measure which, in their opinion, would be the means of constituting a great nation, by combining the elements of strength and wealth which all the isolated provinces possess. In 1858 the Hon. A. T. Galt revived the subject in the Canadian Parliament, and eloquently dilated on the benefits to be derived from a union of the provinces; and when, in the summer of that year, he became a member of the ministry he insisted on its being made a Cabinet question, with what success is shown by the following paragraph of Sir Edmund Head, the then Governor-General's speech at the closing of the session of 1858:—"I propose in the course of the recess to communicate with Her Majesty's Government, and with the Governments of the sister colonies, on another matter of very great importance. I am desirous of inviting them to discuss with us the principles on which a bond of a federal character uniting the Provinces of British North America may perhaps hereafter be practicable."

This was followed by a despatch addressed to the Imperial authorities, which pointed to a federal union of the provinces as a solution of the grave difficulties which presented themselves in carrying on the Queen's government in Canada. The defeat and subsequent resignation of the Derby-Disraeli Ministry in England prevented any decisive action at that time on the part of the Imperial authorities.

A resolution favourable to union was passed unanimously by the Nova Scotia Parliament in April 1861, and having been transmitted to the Colonial Office, was forwarded by the Duke of Newcastle, the then Colonial Secretary, in a despatch, dated 6th July 1862, to the Governor-General, and to the Lieutenant-Governors of the several provinces. His Grace, after stating that Her Majesty's Government was not prepared to announce any definite policy on a question which had been taken up by only one province, expressed his own opinion in the following words:—"If a union, either partial or complete, should hereafter be proposed with the concurrence of all the provinces to be united, I am sure that the matter would be weighed in this country both by the public, by Parliament, and by Her Majesty's Government, with no other feeling than an anxiety to discern and promote any course which might be the most conductive to the prosperity, the strength, and the harmony of all the British communities in North America."

The Lieutenant-Governors of the several provinces brought the subject before their respective legislatures, at the commencement of their several sessions of 1864, for the purpose of appointing delegates to confer as to the practicability of establishing a legislative union between the Maritime Provinces.

Delegates were accordingly appointed by the Governments of Nova Scotia, New Brunswick, and Prince

Edward Island, and it was arranged that on the 1st of September they should meet at Charlottetown.

Meanwhile Canadian statesmen were engaged in considering the feasibility of effecting such changes in their constitution as would reconcile the conflicting interests of the eastern and western sections of the province. Party government had become wellnigh impossible, and ministry after ministry had to retire from the seemingly hopeless attempt at carrying on the government, when, on the defeat of the Taché-Macdonald ministry, in June 1864, overtures were made by the leaders of the Reform party to the Hon. John A. Macdonald with a view to the settlement of the sectional difficulties by the adoption of a federative system, applying either to Canada or to all the British North American Provinces. These overtures were cordially received, and the result was the formation of a coalition government, pledged to the introduction of the federal system. By a fortunate coincidence, within a month of the formation of the coalition ministry in Canada, the Charlottetown Conference was arranged, and the Canadian Government hastened to ask permission to send delegates. Their request was promptly complied with, and, in accordance with previous arrangement, on the 1st September the delegates met at Charlottetown.

The Canadian delegates, not having been authorised to consider the question of a *legislative* union, were informally present. The proposal to unite the Maritime Provinces in a legislative union was looked upon as impracticable; but the delegates were unanimously of opinion that a union on a larger basis might be effected; and for the purpose of considering the possibility of a federal union and its necessary details, the Canadian Ministers proposed that a further conference should be held at Quebec, subject to the consent of the governments of the Maritime Provinces, and at such time as

His Excellency the Governor-General might name. This arrangement being agreed to, the Charlottetown Conference suspended its deliberations.

The delegates to the Intercolonial Conference at Quebec met in the Parliament Buildings on Monday, the 10th of October; the whole of the members, thirty-three in number, being present. There were seven delegates from New Brunswick, five from Nova Scotia, seven from Prince Edward Island, two from Newfoundland, and twelve, comprising the whole Canadian Ministry, representing Canada.

The conference sat eighteen days in Quebec, and the result of their deliberations was the famous "Seventy-two Resolutions," which, in accordance with the final resolution, were authenticated by the signatures of the delegates, and were ordered to be submitted by each delegation to its own government, the chairman submitting a copy to the Governor-General for transmission to the Secretary of State for the Colonies. After a tour through Canada, during which the delegates from the Maritime Provinces were *fêted* in princely style, they separated, each delegation being pledged to use every legitimate means to ensure the adoption of the scheme by their several legislatures, and by the Imperial Government.

The Canadian Legislature met in January 1865. On the 3d of February Sir E. P. Taché in the Legislative Council, and Hon. J. A. Macdonald in the House of Assembly, simultaneously moved:—"That an humble address be presented to Her Majesty, praying that she may be graciously pleased to cause a measure to be submitted to the Imperial Parliament for the purpose of uniting the Colonies of Canada, Nova Scotia, New Brunswick, Newfoundland, and Prince Edward Island, in one government, with provisions based on certain resolu-

tions which were adopted at a conference of delegates from the said colonies, held at the city of Quebec on the 10th October 1864." After a debate of over a fortnight's duration, the resolutions were adopted in the council on the 20th of February, by a vote of forty-five to fifteen; and in the Assembly, after a most exhaustive and exhausting five weeks' debate, they were agreed to on the 10th of March, by a vote of ninety-one to thirty-three. After the close of the session in April 1865, the Hon. Messrs. Brown, Cartier, J. A. Macdonald, and Galt proceeded to England, in order to confer with the Imperial authorities upon the subject of confederation and other matters connected therewith of colonial and national importance. The Imperial Government again renewed their assurances of their approval of the confederation scheme, and their desire to promote its adoption by every legitimate means.

In New Brunswick the Quebec scheme was brought before the people at the general election in March 1865, and a House of Assembly hostile to that scheme was chosen. An anti-confederation ministry came into power, and things looked ill for a speedy success of the union cause. However, after events proved that the real sentiments of the people of New Brunswick upon the subject of confederation had not been obtained, and that the elections of 1865 had been carried in a great measure by side issues.

Ultimately a resolution was adopted in both Houses favourable to confederation, and thus the question was settled so far as the Government and Legislature of New Brunswick were able to further it.

To Nova Scotia belongs the honour of having taken the initiatory steps which led to the adoption of the confederation scheme. In the session of 1861 a resolution which received the unanimous assent of the Legislature

was the means of bringing about the Convention at Charlottetown, which, as has been seen, resulted in an adjournment to Quebec. After the Quebec Conference, the Government of Nova Scotia took no immediate steps for the furtherance of the confederation scheme. Early in 1866, however, the following resolution was submitted to the House of Assembly by Hon. Dr. Tupper, and carried by a considerable majority :—

"*Whereas,* in the opinion of this House it is desirable that a confederation of the British North American Colonies should take place:

"*Resolved therefore,* That His Excellency the Lieutenant-Governor be authorised to appoint delegates to arrange with the Imperial Government a scheme of union which will effectually insure just provision for the rights and interests of this province. Each province to have an equal voice in such delegation, Upper and Lower Canada being for this purpose considered as separate provinces."

In Newfoundland the subject of confederation was brought before the Legislature by His Excellency the Governor in his speech at the opening of the session, 30th January 1866; and the House in Committee of the whole on the address in reply to His Excellency adopted the following paragraph in answer thereto, 16th February 1866, Mr. Knight in the chair :—

"On the important question of confederation, in recognising the solicitude of Her Majesty's Government for the welfare of this colony, we concur in the view of your Excellency that the abstract advantages of union are so obvious as to be almost necessarily acknowledged; whilst with regard to this colony and on the details of so grave a measure it is natural that much diversity of opinion should prevail. This is a matter which shall engage our serious attention."

On the 8th March the House of Assembly, after sitting in Committee of the whole House for several days, adopted the following resolution :—

"*Whereas* this House has recently, in reply to the speech of His Excellency the Governor, on opening the present session, abstained from pronouncing any decision on the proposal for a union of the colonies, or on the details of the measure as regards this colony, and considering the present uncertain state of public sentiment on this grave question, and being unadvised of the action thereon that may be taken or contemplated by the other provinces

"*Resolved*, That whilst duly regardful of the momentous character of this subject, and of the promise to His Excellency to give it attention, yet, as no information has been received demanding its immediate reconsideration, this House does not deem it expedient to enter upon its discussion with a view to any decision thereon."

Had the course which was shortly afterwards taken by New Brunswick and Nova Scotia, in appointing delegates to confer with the Imperial Government, been adopted somewhat sooner, or had the meeting of the Legislature of Newfoundland taken place a few months later, so as to give the members an opportunity of knowing what was being done on the subject of confederation in the sister colonies, it is more than probable that a similar course would have been adopted in Newfoundland.

The Legislature of Prince Edward Island repudiated the action of its delegates at the Quebec Conference, and that island was the latest province received into the Dominion.

Just about the time of the final struggle in Nova Scotia, the Legislature and people of British Columbia were taking steps to secure their admission into the sisterhood of colonies forming the new Dominion. On the 18th of March the Legislative Council of that province unanimously adopted a resolution expressive of their

desire that British Columbia should be admitted into the Canadian Confederation. And on the 19th March, at a large public meeting in Victoria, Vancouver Island, resolutions were adopted urging that steps should be immediately taken for the furtherance of the wishes of the colony in that direction.

During the summer of 1866 the colonies who had pronounced in favour of confederation made arrangements for the meeting of a conference of delegates from the several provinces to settle the details and determine the precise terms of the Act giving effect to the union of the provinces of Canada, New Brunswick, and Nova Scotia, which should be submitted for adoption by the Imperial Parliament. The several Governments duly appointed delegates, and these gentlemen met, according to the appointment, in London, early in December 1866, and immediately proceeded to business. The Hon. John A. Macdonald was elected chairman by the unanimous voice of the conference, and for several weeks they were engaged late and early in their arduous task of framing a nation's constitution. Lord Carnarvon afterwards bore testimony to the statesmanlike qualities which were displayed in the settlement of sectional difficulties, the unravelling of knotty points, the mutual forbearance and the zeal and assiduity displayed during the prolonged sittings of the conference.

The Imperial Parliament met on the 5th of February 1867. On the 7th the Bill for the Confederation of the North American Provinces was introduced into the House of Lords by Lord Carnarvon, the then Colonial Secretary, and was received with approbation by all parties. On the 19th it was read a second time, was passed through Committee of the whole House on the 22d, and on the 26th February was read a third time. It was at once brought down to the House of Commons, and on the 28th

February was moved to a second reading. After a long and interesting debate, during which no member of any prominence, with the exception of Mr. Bright, opposed the measure, the motion was agreed to without a division. It passed through Committee of the whole House on the 4th of March, and was read a third time and finally passed the House of Commons on the 8th of March. On the 28th of that month it received the royal assent and became one of the laws of the empire. The name chosen for the united provinces was "The Dominion of Canada," Upper Canada to be henceforth called Ontario and Lower Canada Quebec.

The work of legislation being finally completed, Her Majesty was graciously pleased to issue her proclamation on the 22d of May, declaring that the Dominion of Canada should commence its existence on the 1st of July 1867, and appointing the members of the Senate.

By this proclamation the two provinces of old Canada, now designated Ontario and Quebec, were united with Nova Scotia and New Brunswick under the name of the Dominion of Canada. On the 15th July 1870 the vast territories in the occupation of the Hudson Bay Company were incorporated with the Dominion, which extinguished the title of the Company by a considerable payment, and assumed the formal Imperial responsibilities attendant on the management and control of the numerous Indian tribes of the interior. On the 20th July 1871 British Columbia entered the Confederation, and on the 1st July 1873 Prince Edward Island joined her sister provinces, thus finally completing the consolidation under one Federal Parliament and Government of the entire British possessions in North America from the Atlantic to the Pacific Ocean, with the single exception of the island of Newfoundland, which thus far has maintained its separate political existence.

Under this Act the complete control of everything pertaining to their internal affairs was conferred upon the people, subject only to their allegiance to a common sovereign, and their duties as members of the British Empire. These powers are exercised under the Federal system, by which the united Parliament, consisting of the Governor-General as the representative of the Queen, with the Senate and House of Commons, enact all the laws in which the public at large may be said to have a common interest, such as trade and commerce, navigation, fisheries, indirect and direct taxation, postage, criminal law, and the establishment of a suitable government for the vast regions of the interior.

Under the United States system the Central Government is the delegate of the sovereign States, whilst under the Canadian Confederation the Imperial Government is supreme, and has delegated to the Dominion and Provincial Parliaments a limited sovereignty, with control in the departments entrusted to them respectively.

It was feared that the heavy strain put on the American constitution by the late civil war would have been fatal to their system. The Central Government, however, maintains the national existence, and the United States developed astonishing recuperative power. The opponents of Canadian confederation objected to what they assumed to be excessive powers conferred on the Central Government as tending to prejudice provincial interests. So far no inconvenience has been felt on this point; and whilst the older nations of Europe are watching with interest these two systems of confederation, the people of Canada feel assured of the fitness of their system to the wants of the country, and rejoice in what they enjoy, namely, actual independence, a responsible government under their own control, and a close and loyal alliance with the British Empire.

CHAPTER XVI.

EDUCATION.

CANADA offers a fair and free education to all who attend her public schools; a higher education in her grammar schools at a trifling cost; and the highest education in arts, sciences, and professions in her universities at a very moderate expense. Military engineering and science are taught at the Military College, Kingston, open to all British subjects who pass the prescribed competitive examination of this Canadian Woolwich.

Agricultural colleges, combining a sound literary education with practical agriculture, and almost free of cost, train the youth of the country to agriculture, and have been established in the Provinces of Quebec, Ontario, and Manitoba. The higher education of women is not neglected, and separate colleges or special courses with graduation have been adopted in some of the English-Canadian universities. Free schools of art and design, in connection with industrial pursuits, as well as an academy for the cultivation of the higher branches of art, are in active operation. Even the blind and mute have at their service the means of education devised for their benefit by philanthropists; and when to this list is added the several organisations for education in technical branches, and the private seminaries and schools which abound throughout the land, Canada may be said to afford educational advantages equal to any country in the world.

In the Provinces of Quebec, Ontario, Nova Scotia, and Manitoba, the denominational system obtains in the public schools, the rights of universities being protected under the Confederation Act, so that a certain number, constituting a minority, may establish a separate school, and apply their rates exclusively to its support. Each public school receives from the Government of the province an annual grant, on the basis of the average attendance.

In New Brunswick, and in Prince Edward Island, provision was omitted under the Confederation Act for separate schools, which has caused dissatisfaction on the part of the minority of Roman Catholics, but will probably be remedied by legislation.

The Province of Ontario ranks first in primary instruction, not only in Canada, but in the world, as the attendance of scholars in her public schools has reached 23 per cent of the total population, the highest per centage ever attained in any country.

Under the Ontario Education Acts all public schools are free, and the gradation from primary or common schools to grammar schools and collegiate institutes, with the university in perspective, is by competitive public examination.

Every child from 7 to 12 years of age has the right to attend school for four months in the year, and a penalty is imposed on parents or guardians neglecting this provision.

Pupils are not required to observe religious exercises objected to by their parents, but they may receive such religious instruction as their parents desire.

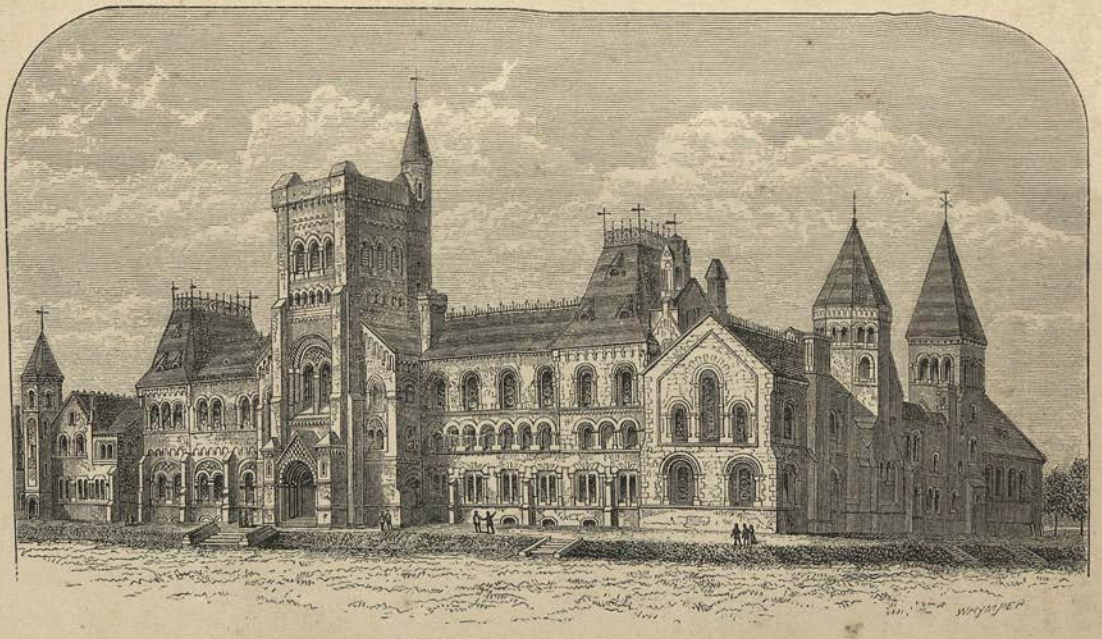
Religious education does, however, receive equal care and attention with secular education in Canada. Apart from the several churches, Sunday schools for the young and training schools for Sunday school teachers are a

noticeable feature in the Canadian educational system. The Sunday school, originally used as an elementary one for children not having the benefit of ordinary day schools, is now recognised and adopted as beneficial to all, so much so that it has become the broad foundation on which the Protestant churches in Canada gather their supporters around them. Clergy and laity vie with one another in this field, and their influence for good is felt in the family and in the State. The Roman Catholics adopt the religious training of their youth as an essential part of their system in their universities, colleges, convents, and schools, but do not favour lay teaching. The universities of the several provinces are well attended, and well managed. Those of Ontario, in Toronto, Kingston, London, Ottawa, and Coburg, would do credit to any country. Even Manitoba has its colleges, both Protestant and Roman Catholic. In the Province of Quebec M'Gill and Laval, the former in Montreal and the latter in Quebec, are flourishing institutions. M'Gill University has several colleges affiliated with it, and is governed, under an amended charter, by a board who are the representatives of the "Royal Institution for the Advancement of Learning." It was founded by the late James M'Gill in 1811, received its charter in 1821, obtained a new charter in 1852, and was reorganised in 1854. It is specially referred to here as having received its original endowment, and as having been maintained almost entirely, by the munificence of the citizens of Montreal. Its characteristics are—that it is Protestant but not denominational, and that under the management of Principal Dawson, LL.D., C.M.G., F.R.S., it has developed facilities for literary, scientific, and professional training, and has maintained so high a standard for graduation that it sheds a lustre on the educational system of Canada.

Already the several denominational colleges are crys-

tallising around it; the names of some of its professors and associates have more than a local reputation in science; and it is attracting to Montreal the scientific associations of the neighbouring republic and of the leading nations of Europe.

The accompanying sketch of University College, Toronto, is illustrative of the style of building and size of an Ontario university



UNIVERSITY COLLEGE, TORONTO.

To face page 624.

London: Edward Stanford, 55 Charing Cross.

CHAPTER XVII.

NEWFOUNDLAND.

THIS island is the outpost of the continent of North America, and the nearest land to Europe, being only 1650 miles from the west coast of Ireland. It is the largest island in the Atlantic, and lies between 46° 38′ and 51° 40′ north latitude, and 52° 35′ and 59° 35′ west longitude. Lying across the mouth of the Gulf of the St. Lawrence, it divides it into the Strait of Belle Isle, with the coast of Labrador to the north, and the main entrance with the island of Cape Breton to the south.

It is supposed that it was the first land in the New World visited by Europeans. The Icelanders are said to have landed on its shores in A.D. 1000; and the English in 1536 attempted the first settlements. In our day it has maintained the lead to which its geographical position entitles it, and received the first telegraphic cable on its shores which was laid across the Atlantic Ocean in 1861.

The superficial area of the island is 42,000 square miles, with a circumference of 1200 miles, and a coast line of 2000 miles. Its widest point between Capes Ray and Bonavista is 300 miles, and the extreme length from Cape Race to Griguet Bay is about 419 miles, measured on a curve. The form of the island is that of an irregular triangle, with indentations of several deep bays, the most remarkable of which are Hare, White, and Notre Dame Bays, Bay of Exploits, Bonavista, Trinity, and

Conception Bays, on the east coast; St. Mary's, Fortune, and Placentia Bays on the south coast; and St. George's and the Bay of Islands on the west coast; with several smaller bays and harbours. Most of these bays are commodious and well sheltered, with numerous streams running into them, and nearly all of the harbours have safe anchorages, with clear and good channels.

The interior of the island has never been fully explored, but from the reports of Mr. Murray, the geologist, who has been for many years past, and is still, engaged in its exploration, there is reason to believe that its resources, both agricultural and mineral, are of very considerable importance. The greater portion, however, appears to be rocky, with numerous tracts of moss, much intersected by rivers and lakes, and but thinly wooded except on the banks of the rivers. Great boulders or loose rocks, scattered over the country, increase its general roughness. Hills and valleys continually succeed each other, the former never rising into mountains, the highest not exceeding 1500 feet, and the latter rarely expanding into plains. The "barrens" of Newfoundland are those districts which occupy the summits of the hills and ridges, and other elevated and exposed tracts. They are covered with a thin and scrubby vegetation, consisting of berry-bearing plants and dwarf bushes of various kinds. Bare patches of gravel and boulders, and crumbling fragments of rock, are frequently met with on the "barrens," which are generally destitute of vegetable soil. The sea-cliffs are, for the most part, bold, lofty, and with deep water close to the shore.

The rivers of Newfoundland are numerous, and though the majority are small, yet some attain to respectable size. The largest are the Humber, River of Exploits, Gander and Terra Nova rivers. The Humber in its main branch is about 80 miles long; in its second, or

Grand Pond branch, it is about 48 miles long. The Exploits is about 150 miles long, and drains about 3000 square miles of country. The Gander is somewhat over 100 miles long. Nearly all the rivers issue from lakes or ponds in the interior. Many of them abound with excellent salmon. Fresh-water lakes and ponds are numerous over the face of the entire country, and on the very tops of hills. The surface covered with fresh water has been estimated at one-third of the whole island. Sixty-seven ponds have been counted from one spot on the north-east mountains of Ayalon, some of them two and three miles in extent, none less than 100 yards. The principal lakes in the island are the Gander Pond, Deer Pond, Grand Pond, and Red Indian Pond. The Grand Pond contains an area of about 185 square miles; this includes an island at its south-west end, which contains an area of about 50 square miles. Deer Pond has an area of about 30 square miles. The Red Indian Pond has an area of 64 square miles. The Gander Pond is supposed to be of large extent, but has not yet been measured.

Except some limited areas of Carboniferous and Devonian strata in the north-western parts of the island, Newfoundland is exclusively occupied by formations of Archean and Lower Palæozoic age belonging to the Laurentian, Devonian, Cambrian, Cambro-Silurian, and Silurian systems; the first, consisting chiefly of granite, gneiss, and mica-schist, being the most prominent, especially in the central and southern districts. The economic minerals comprise ores of iron, nickel, copper, lead, and manganese. Gold has also been found, and traces of bismuth and cadmium. Gypsum has been largely worked both for home consumption and also for export. Coal, plumbago, petroleum, peat, shell marl, salt, red ochre, limestone, marbles, building stone, brick clay, serpentine and other ornamental stones, are also mentioned by Mr. Murray,

and it seems probable that nearly all of these useful minerals are in sufficient quantity to be utilised.

The principal mines are the Tilt Cove Mine (copper), the Notre Dame Mine (copper), both on the eastern side of the island; and La Manche Mine (lead) on the southern coast. The first-named has been very productive; the other two have not been so successful, though there is no doubt they are rich in mineral.

The climate is not liable to so great changes in temperature as that of the neighbouring continental provinces, the winter being much milder, and the summer not nearly so warm.

The mean of the various months at St. John's, Newfoundland, is:—

	Jan.	Feb.	March.	April.	May.	June.
	°	°	°	°	°	°
St. John's	23·3	20·9	24·2	33·4	39·3	48·0

	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
	°	°	°	°	°	°	°
St. John's	56·2	57·9	53·0	44·5	34·0	25·3	38·3

The temperature is thus like that of Halifax, singularly even, but considerably lower in the summer months, a difference which is probably less on the Gulf shores than it is on the Atlantic. Bishop Mullock gives the highest reached temperature at 96°, on 3d July 1859; but the records sent to the Smithsonian Institution give 88°, in August 1859, and 86°, in July 1834, as the two highest markings. The Smithsonian tables give −14°, in February 1834, as the lowest point reached, a degree of cold which is of rare occurrence. The fogs which prevail on the banks do not extend to the island, except with certain winds, and the mean obscuration of the sky at St. John's is not more than in the other chief cities of

North America. Some parts of the island grow fair hardwood, but the neighbourhood of the fishing stations is generally of poor soil, and supports, in addition to moss, only a small growth of spruce.

In a recent report, 1876, on the timber lands on the Humber and Gander rivers, the pine timber is thus described :—To give a rough estimate of the extent of fine timbered land from the mouth of the Humber to the Grand Pond brook, I should say that in all there is less than twenty square miles which would on the average yield five trees of from one thousand to two thousand five hundred superficial feet each to the acre, or three thousand two hundred trees to the square mile. The principal trees are, however, spruce, birch, larch, and willow, which do not generally attain a large size. Great varieties of evergreens and other heavy growing bushes abound.

The agricultural capabilities of Newfoundland are undoubtedly considerable; wheat will grow in some places, and has been known to yield 30 bushels per acre; barley and oats everywhere; and the even temperature permits of the regular growth of grasses, so that it ought to be as well adapted for sheep farming and grazing as any other part of North America. Potatoes are productive and of excellent quality; and all garden vegetables, such as cabbages, carrots, turnips, are brought to the highest perfection. Apples, plums, and cherries, are raised with success, also gooseberries, strawberries, and raspberries. There appears to be no reason why Newfoundland should not, some day, be the home of an agricultural population numbered by millions.

The timber lands, amounting to nearly one million acres, and situated principally on the western side of the island, and by the chief lakes and rivers, are wholly unsettled and ungranted, though they are of high importance

with a view to settlement. What may be the extent and nature of the lands of the interior it is impossible to say, as they have never been fully surveyed. No lands are let for lumbering purposes; the laws provide that they shall be disposed of for settlement alone. With the exception of the grant to the New York, Newfoundland, and London Telegraph Company, which consists of one hundred square miles in blocks of three miles each, no land has been given to purchasers in quantities exceeding 200 acres, save in very few instances.

The only animal peculiar to the island is the Newfoundland dog, famous the world over. Among the wild animals may be enumerated the deer, the wolf, the bear, the beaver, the marten, and wild cat. Land and aquatic birds are numerous. Seals are numerous on the coasts, as are also whales, grampuses, and porpoises; while for fish there is no place in the world comparable to Newfoundland, especially for cod. The famous Grand Banks swarm with cod and every other variety of fish. These banks form the most extensive submarine elevation on the face of the globe; in their full extent they occupy 6° of longitude, and nearly 10° of latitude, being over 600 miles in length and 200 miles in breadth, with a depth of water varying from 10 to 160 fathoms. The mean depth is estimated at 40 fathoms. The prosecution of the fishery on the Grand Banks has of late years been left exclusively in the hands of foreigners, principally French; whilst the shore fishery, which, with less risk, is more convenient, is depended upon by the fishermen of the island for their support. The cod fishery opens in June and lasts till the middle of November, and may be said to form the chief occupation of the inhabitants of the island. The seal fishery is next in importance.

The imports of Newfoundland consist of all articles used for food and clothing, as well as for domestic and

fishing purposes. The principal exports are fish and fish oils, seal oil and skins.

The Government of Newfoundland pays $120,000 annually for the steam service of the colony. The steamers subsidised are the Allan Line to and from Liverpool and Halifax, or some port in the Dominion or United States, once a fortnight; one steamer once a fortnight from St. John's northward; one steamer once a fortnight from St. John's westward; one from St. John's to Conception Bay; one to convey the judges on circuit to the several courts held on the island; and one on the Labrador coast, running once a fortnight along the shore from south to north, and *vice versâ*, giving information to the fishermen where the fish is most abundant.

The public affairs of Newfoundland are administered by a Governor, an Executive Council of six members, a Legislative Council of thirteen members, and a Legislative Assembly of thirty-one representatives. The judicial department comprises a Supreme Court, with a chief and two assistant judges; a Vice-Admiralty Court, and a District Court.

The inhabitants of Newfoundland are principally the descendants of the settlers from England and Ireland.

The first Governor was appointed in 1728, and the first Legislative Assembly met on the 1st of January 1733. The most noteworthy town on the island is St. John's, the capital. It has telegraphic communication with Canada, the United States, and Europe, as well as with the principal places in the island.

A railway, now under contract, and intended to cross the island from east to west, promises, it is said, to bring about the extension of agriculture and the consequent lessening of the present drain caused by the importation of nearly all the agricultural produce required by the colony. It is calculated that at present farm produce, cattle, and horses are imported to the annual value of a

million and a quarter of dollars, all of which could be raised in the island were the fertile lands rendered accessible by a railway. As an illustration of the necessity of a railway for the purpose referred to, the Geological Surveyor, writing of a district lying round the Gander Lake, says in one of his reports: "Within this region there probably are nearly or quite seven hundred square miles admirably adapted for the pursuits of agriculture, and a not much smaller area still covered with pine and spruce, where a great trade in lumber might be prosecuted with profit to adventurers and immense advantage to the country at large. A very large proportion is of rich and fertile soil." Mr. Howley, assistant geologist, says: "The soil here, over a vast area, is of excellent quality, and capable of yielding rich harvests. Taking everything into consideration, I do not think a more promising country, or one more easy of access, could be found in British America. In all my travels about the island I have nowhere seen anything like the quantity of pine timber to be met with here." At present this splendid district of 1400 square miles is a complete solitude without a single settler, and from the want of roads it is entirely inaccessible. The same is true of the Exploits Valley, containing 1620 square miles, most of it favourable for settlement. This too will be traversed by the railway. The extent of arable land and grazing lands which will be rendered accessible by the railway will be about five millions of acres. In fact, there is no reason, either in regard to soil or climate, why Newfoundland may not become very largely an agricultural country. Of course there are large districts comparatively barren, and which will never be reclaimed, but the same is true of every province in British America; and, be it remembered, this island has an area of 42,000 square miles, and is one-sixth larger than Ireland. When its inexhaustible

fisheries, its forests, minerals, and agricultural lands, are all taken into account, it is evidently capable of sustaining a very large population. At present the population is only 180,000.

The small islands of St. Pierre, Miquelon, and Langley, lying off Fortune Bay on the southern coast, and distant from the mainland about 7 miles, are the last of the French possessions in North America, being held under the treaty of Utrecht as a fishing station, with certain fishing rights between Cape Ray northward through the Strait of Belle Isle, and then eastward to Cape St. John, and the right of drying fish on the coast within these limits. No fortifications are allowed on the island, and only a garrison of 50 men.

The Americans had also certain treaty rights under the several treaties of 1783 and 1818. The reciprocity treaty of 1854 was abrogated by the United States in 1866, and the present treaty of Washington gives them the right to the shore fisheries, and of curing their fish on the unoccupied shore, and in fact equal rights with British subjects, but no more, as they would sometimes assume. The rights of the Americans under the treaty of Washington will continue for 12 years from the 1st June 1874, and then it is probable that the "headland" question will be revived, unless some arrangement be made by further treaty.

Great Britain has always held the fisheries of Newfoundland in high estimation on account of their commercial value, as well as justly considering that these coasts afford a training ground for her seamen. The French and the Americans covet these "preserves," and constant difficulties arise between the seamen of the several nationalities, the islanders being inclined to interpret the treaties strictly, and the others liberally.

St. John's, Newfoundland.

St. John's, the most eastern seaport and city of North America and the capital of Newfoundland, lies near the extremity of the easternmost of the numerous peninsulas which project from the eastern portion of the island. It is 1665 miles W. by S. of Galway, Ireland, this being the shortest distance between any two seaports of Europe and America, 1076 miles N.E. of Montreal, lat. 47° 33′ 6″ N., long. 52° 45′ W. The harbour is one of the very best on the Atlantic coast. It is inclosed between two mountains forming the entrance called the "Narrows," only 95 fathoms wide in its narrowest part, and 100 fathoms long. This entrance is defended by several fortifications, and could easily be made impregnable. It has 12 fathoms of water in mid-channel, but only one vessel can pass at a time. Within there is ample space for shipping in good anchorage, with perfect shelter. There are no perceptible tides; a light on Cape Spear (distant 3 miles from the harbour) is visible 30 miles at sea. In foggy weather a 32-pounder is fired every half hour, and a compressed air-trumpet is sounded continuously for seven seconds in every minute, enabling vessels to enter the "Narrows" at all times. The town is situated on an acclivity, and consists chiefly of one street, 1½ miles in length, rather irregularly built, but containing many good shops and warehouses.

The trade of St. John's consists chiefly in supplying fishermen with clothing and fishing and hunting gear. During the spring season the harbour is thronged by merchant vessels from almost all parts of the world, loaded with goods and provisions required in the fisheries.

British sovereignty was established in Newfoundland as early as 1582 by Sir Humphrey Gilbert. The French

subsequently took possession of the island, but it was again taken by the English in 1762.

The construction of a railway across the island of Newfoundland, the working of immense deposits of copper on the eastern and north-eastern coast, the discovery of large beds of coal, and the development of the timber lands in the interior, and access to good agricultural lands on the western side of the island, are giving an impetus to Newfoundland, of which St. John's will reap the benefit. Population of St. John's in 1874, 23,890.

STATEMENT of EXPORTS from Newfoundland and Labrador for the year ending 31st July 1880.

	Quantities.			Value.
Fish and Fish Products—				
Blubber	60 tuns	at	70s.	£210
Codfish, dried	1,419,505 quintals	,,	17s.	1,206,579
,, green	372 ,,	,,	6s.	111
Cod oil	4,483 tuns	,,	£25	112,075
,, refined	172 ,,	,,	£45	7,740
Cod roes	760 barrels	,,	15s.	570
Caplin	440 ,,	,,	2s. 6d.	55
Cod sounds	28 packages			7
Halibut, pickled	88 cwt.	,,	20s.	88
Herrings, frozen	2,398 barrels	,,	4s. 6d.	539
,, pickled	56,197 ,,	,,	20s.	56,197
Haddock	712 cwt.	,,	13s.	462
Lobsters	1,124,580 lbs.	,,	5d.	23,428
Mackerel, pickled	5,766 barrels	,,	15s.	4,324
Salmon, pickled	6,765 tierces	,,	£5	33,825
,, in ice	1,512 lbs.			37
,, in tins	34,884 ,, tins	,,	6d.	864
Trout, pickled	1,080 barrels	,,	30s.	1,620
Turbot, pickled	7 ,,	,,	20s.	7
Cod dregs	7 tuns	,,	£12	84
Skins, Oil, Copper Ore, etc.—				
Seal skins	223,795	,,	4s.	44,759
,, oil	4,849 tuns	,,	£31	150,319
Whale oil	44 ,,	,,	£25	1,100
Other oils	2 ,,	,,	£22	44
Copper ore	25,545 tons	,,	£5	127,725
Unenumerated articles				1,000
				£1,773,769

LABRADOR.

Not entered in Newfoundland returns.

Codfish, dried	398,397 quintals	£338,637 9
,, green	337 ,,	101 2
Herrings	31,690 barrels	31,690 0
Salmon	264 tierces	1,320 0
Trout	3 barrels	4 10
Seal oil	11 tuns	341 0
Cod oil	78 ,,	1,950 0
Seal skins	101	404 0
		£374,448 1

	£1,773,769
	374,448
Total	£2,148,217

The average catch of cod in the French colonies of St. Pierre and Miquelon, during a period of five years ended 1871, was 15,425,086 kilogrammes, a kilo. being equal to 2205, or a trifle less than $2\frac{1}{4}$ lbs. The average number of ships employed in these French fisheries, during five years ended in 1874, was 76, and 590 men—total tonnage 12,386, the number of fishermen being 5335.

The yearly catch on the banks and on the shores of Newfoundland amounts to 2,750,000 quintals.

NEWFOUNDLAND DOG.

INDEX.

Abies, or Douglas pine, ii. 385
Abittibe river, ii. 305
Acadian highlands, ii. 330
Adams mount, i. 112
Adelaide cape, ii. 321
Adironacks mountains, i. 6, ii. 329, 339
Admiralty, Canadian woods at the, ii. 493
Agoomska island, ii. 304
Akpatok island, ii. 303
Alabama, minerals in, i. 13
A la Crosse lake, ii. 425
Alaska, formerly Russian America, i. 276; ii. 289
  agriculture, i. 278
  acquisition, i. 276
  climate, i. 278
  coal-beds, i. 279
  export of ice, i. 285
  geology of, i. 283
  inhabitants, i. 277
  minerals, i. 284
  seal fisheries, i. 279
  timber, i. 279
Albany river, ii. 305
Alberta, district of, ii. 290
Albreda lake, ii. 442
Aleutian islands, otter and seal hunting, i. 281
Aleutians, i. 278
Alexandria, ii. 447
Algonquins, or Algie tribes, ii. 559
  locations, ii. 559
  numbers, ii. 560
Aliaskan range, i. 277
Alleghanies, the, i. 7; ii. 329
Alleghany coal-field, i. 15, 17, 28
  river, i. 24
Allumette lake, ii. 364
Amargosa range, i. 108
Amelanchier alnifolia, ii. 400
America, continent of North, i. 1
  census returns, i. 203
  colleges, i. 242
  Cornell university, i. 244
  Danes in, i. 206
  discovery of, i. 163
  Dutch in, i. 165, 205
  education, i. 240
America, first English settlements, i. 164
  Flemings in, i. 206
  Germans in, i. 206
  ground-plan of towns in, i. 181
  Irish in, i. 207
  names of towns in, i. 182
  national debt, i. 269
  New Englanders, i. 204
  Norwegians in, i. 206
  prehistoric, i. 232
  principal cities in, i. 181
  Puritans and Quakers in, i. 166
  religion in, i. 246
  Russian, or Alaska, i. 276
  Russo-Germans in, i. 206
  schools, i. 240
  social relations, i. 239
  Swedes in, i. 165, 206
  Swiss in, i. 206
  Tertiary age, i. 54
  universities, i. 242
Amorpha canescens, ii. 401
Ampelopsis quinquefolia, ii. 400
Amur river, i. 278
Anapolis basin, ii. 295
Anderson lake, ii. 443
Anthracite, first discovery of, i. 16
  amount obtained in fifty years, i. 17
Anticosti island, ii. 298, 361
  area of, ii. 298
Antigonish, ii. 297
Appalachian mountain system, i. 5; ii. 329
  coal-fields, i. 14
  geographical structure of, i. 5
  mineral resources, i. 11
  ranges, vegetation of, i. 8
  region, geology of, i. 8
  valley, the Great, i. 6
Aravapa cañon, i. 129
Archipelago between 125th meridian and Baffin bay, ii. 321
Arctic coast, ii. 291
  commercial value, ii. 324
  general account, ii. 318
  result of the Franklin expeditions, ii. 320
Arctic ocean, shores of, i. 4
Arctostaphylos Uva-ursi, ii. 402
Arizona, Indians settled in, i. 218
  gold and silver in, i. 136
Arkansas river, i. 23, 128
  "hot springs," i. 27
Arrow lakes, Upper, ii. 443
Artemisia, i. 46, 81
Assiniboia, district of, ii. 290
  general account of, ii. 397-407
Assiniboine river, botany of, ii. 400
  clay of, ii. 421
Astralagus, ii. 402
Athabasca, district of, ii. 290
  or Elk river, ii. 430
  lake, ii. 432
  or Lake of the Hills, ii. 438
  landing, ii. 477
  river, ii. 349, 429
Athikesipichégan or Frog portage, ii. 431
Atlantic coast, general account, ii. 295
  length of shore-line, ii. 295
Attahwahpiskat river, ii. 305
Aux Coudres island, ii. 361
Avalon, mountains, ii. 627
Aylmer lake, ii. 335
Aztecs, ruins of cities of the, i. 235
  cave-dwellings, i. 237
  pottery of, i. 238

Babine lake, ii. 446
  or Kit-koin, or Na-to-bun-kut, ii. 446
  or Simpson river, ii. 437
  vegetation, ii. 476
Back or Great Fish river, ii. 320, 321
"Bad lands," i. 49
Baffin's explorations, ii. 319
Baffin island, ii. 321
  land, ii. 322
Baie des Chaleurs, ii. 298
Baie Verte, ii. 298
Baker mount, i. 111; ii. 600
Baker's park, i. 90

Balsam, Great, mountains, i. 7
Baltimore, the Monumental City, i. 190
education, i. 190
parks, i. 190
population, i. 181
public buildings, i. 190
Banks land, ii. 323
"Barren Grounds," the, ii. 427
fish, ii. 428
fruits, ii. 428
game, ii. 427
Barriefield, ii. 595
Basin, Anapolis, ii. 295
of Mines, ii. 295
St. Lawrence, ii. 291
Bathurst cape, ii. 321
Battle river country, ii. 290
Battleford, ii. 290
Bays—
Bellingham, i. 160
Cataraqui, ii. 595
Chebucto, or Halifax Harbour, ii. 581
Chedabucto, ii. 296
Chesapeake, i. 190
Conception, ii. 626
Darnley, ii. 320
Esquimaux, ii. 299
of Exploits, ii. 625
Fortune, ii. 626
Franklin, ii. 320
Frobisher, ii. 301
of Fundy, ii. 295, 583
Georgian, ii. 371
Griguet, ii. 625
Hare, ii. 625
Hudson, ii. 300
Invertoke, ii. 299
of Islands, ii. 626
James, ii. 300
Khogochaik, i. 278
M'Intyre, ii. 375
Mackenzie, ii. 320
Mosquito, ii. 307
North, ii. 302
Notre Dame, ii. 625
Ombabika, ii. 374
Saginaw, ii. 372
St. George, ii. 297
St. George's, ii. 626
St. Mary, ii. 295
St. Mary's, ii. 626
of St. Paul, ii. 360
St. Peter, ii. 296
Siniahmoo, ii. 445
South, ii. 375
Thunder, ii. 461
of Toronto, ii. 596
Trinity, ii. 625
of Ungava, ii. 302
White, ii. 625
Beacon hill, Victoria, ii. 601
Beacon point, ii. 409
Bear river, i. 104
Beaver or Churchill river, ii. 424
Becher's chart, ii. 302
Bedford basin, ii. 581
Bee-culture, ii. 533
Bell, Professor, ii. 376
Belle Isle strait, ii. 297
Belleville, ii. 369
Bellingham bay, i. 160
Bellot strait, ii. 320, 323
Belly river country, ii. 290
Benicia, i. 200
Bering strait, discovery of, i. 276
whale fisheries, ii. 429
Betsiamite river, ii. 336
"Big Bend," the, ii. 445
Big Horn mountains, i. 82
Big Horn river, i. 82
Big river, ii. 305
Birkenhead river, ii. 443
Bitter Root range, i. 58
Bizard island, ii. 357
Black or Westroad river, ii. 441
Black Dome, i. 7
hills, i. 47
mountains, the, i. 7
river, ii. 364
Blackfeet Indians, ii. 570
Blanc Sablon, ii. 361
Blodgett, Lorin, ii. 459
Blomidon, cape, ii. 295
Blue Ridge, the, i. 7
Boat Encampment, ii. 430
"*Bonanza*" and "*borrasca*," i. 155
Bonavista cape, ii. 625
Boothia Felix peninsula, ii. 320, 323
Boothia gulf, ii. 320
Borax found in California, i. 135
Boston, population, i. 181
Boularderie island, ii. 296
Boundary-line of United States, i. 33, 34
Bow river country, ii. 290, 407
Brandt, leader of Indians, ii. 562
Brandy Pots islands, ii. 361
"*Bras d'Or*" lake, ii. 296
Brier island, ii. 295
British America, "formidable" climate, ii. 483
plains in, i. 49
British Columbia, ii. 437
area of, ii. 290
climate, ii. 294, 448, 471
general view, ii. 437
gold in, ii. 294
Indians in, ii. 560
interior mainland, ii. 447
lakes, ii. 446
minerals, ii. 501
population, ii. 290
trade, ii. 327
vegetation, ii. 447
British Museum, Canadian woods at, ii. 493
Brooklyn, population, i. 181
Bross, mount, i. 157
Broughton mountain, ii. 334
Buffalo, i. 196
peak, i. 88
wheat market, ii. 486
"Buffalo" grass, i. 45
Buffalo, or American bison, i. 51
hunting, ii. 553
Burns lake, ii. 446
Burrard inlet, ii. 318, 445
Button islands, ii. 302
Brown mount, ii. 340, 430
Bryant, poem on the prairies by, ii. 390
By, Colonel, ii. 365, 593

CABOT, JOHN, re-discoverer of America, i. 163; ii. 605
Cacti, i. 46
California, gold and silver in, i. 136
Japanese in, 217
valley, formations of, i. 134
Calavaras grove, i. 123
Calystegia sepium, ii. 400
Cambie, J. H., ii. 474
Canada, Dominion of—
agricultural capabilities, ii. 382
area of, ii. 293
art in, ii. 550
Atlantic division, ii. 293
backwoods of, ii. 547
bee-culture, ii. 533
boundaries, ii. 291
British military administration, ii. 606
canals, ii. 510
cattle trade, ii. 533
census of 1881, ii. 535
Centennial Exhibition, ii. 496
central division, ii. 291, 294
climate, ii. 292, 294, 453
coal, ii. 501
coast of, ii. 320
colleges, ii. 623
constitutional history, ii. 607
dairy products, ii. 532
Dominion proclaimed, ii. 619
early history, ii. 604
eastern division, ii. 291
education, ii. 621
English in Newfoundland, ii. 605
expulsion of French from Acadia, ii. 606
first settlements in, i. 164
fisheries, ii. 292, 528
forest section, ii. 294, 488
fruit-growing, ii. 495
game for sportsmen, ii. 551
general view of, ii. 289, 328
grasses, the, ii. 494

Canada, Dominion of—
grazing region, ii. 495
healthiness of, ii. 539
history of the Federal Union, ii. 610
immigration, ii. 576
iron, ii. 505
lakes, ii. 335, 338, 344, 446
landing of the Cabots, ii. 605
Laurentides, the, ii. 335
length of boundary, ii. 292
mainland of, ii. 320
manufactures, ii. 527
market gardening, ii. 533
military position, ii. 541
militia, ii. 542
minerals, ii. 501
mines, ii. 501
mountain ranges, ii. 328
natural divisions, ii. 291
navigable water-partings, ii. 347
northern division, ii. 291
north-western division, ii. 291
origin of name, ii. 605
Pacific division, ii. 294
petroleum, ii. 502
physique of people, ii. 539
population, ii. 293
postal system, ii. 524
prairie section, ii. 294, 489
public debt, ii. 533
Quebec Bill, the, ii. 607
railways, ii. 512
roads, ii. 341
red and white pine, ii. 307
routes for immigrants, ii. 523
salt, ii. 503
shipping, ii. 529
silver, ii. 504
tour for visitors, ii. 545-50
trade and commerce, ii. 527
the "U. E. loyalists," ii. 608
"Union Act," conferring government on the Province of, ii. 609
universities, ii. 623
vegetation, ii. 292
volunteers, ii. 543
waterways of the North-West, ii. 347
western division, ii. 291
wheat markets, ii. 485
wild animals, ii. 551
Canadian Indians, fancy work of, ii. 562
"Canadian moon," ii. 357
Canadian river, i. 24
Canals in Canada, ii. 510
Erie, ii. 511
projected canals, ii. 511
Canals in Canada—
Rideau Navigation from Ottawa, ii. 511
river Ottawa, ii. 511
river Richelieu to Lake Champlain, ii. 511
river St. Lawrence and lakes, ii. 511
St. Peter canal, Cape Breton, Nova Scotia, ii. 511
Trent Navigation to Kingston, ii. 511
Canoe river, ii. 438
Cañons of Colorado and Green river, i. 96
Capes—
Adelaide, ii. 321
Bathurst, ii. 321
Blomidon, ii. 295
Bonavista, ii. 625
Boothia Felix, ii. 321
Breton island, ii. 296
Chudleigh, ii. 295
Diamond, ii. 359, 585
Dufferin, ii. 306
Jones, ii. 300
Henrietta Maria, ii. 300
Kent, ii. 321
Melville, ii. 321
North, ii. 297
Race, ii. 625
Ray, ii. 297, 625
Rouge, ii. 605
Sable, ii. 330
Saddleback, ii. 310
St. George, ii. 297
San Lucas, i. 160
Simpson, ii. 321
Spear, ii. 634
Tourmente, ii. 457
Walsingham, ii. 322
Wolstenholme, ii, 302
Cariboo mountains, ii. 443
Carleton, ii. 290
Cartier, Jacques, i. 164; ii. 605
Cascade mountains, i. 40
formations of, i. 134
range, i. 110; ii. 329, 343
road over, ii. 341
Cataraqui bay, ii. 595
Cattle range on Great Plains and California, etc., i. 126
Cayoush river, ii. 444
Cayuga, ii. 504
Cedar lake, ii. 350, 393
mountain, ii. 600
river, i. 24
trees, i. 265
Chambly, ii. 367
Champlain lake, i. 6
Champlain's estimates of Indians, ii. 558
Chappell, Lieut., R.N., account of Hudson bay by, ii. 301, 310
Charlottetown, Prince Edward island, ii. 584
Charlton island, ii. 304
Chatte river, ii. 334
Chaudière river, ii. 367
Chaulelasmus streperus, ii. 398
Chauvin, ii. 605
Chebucto bay, or Halifax harbour, ii. 581
Chedabucto bay, ii. 296
Chesapeake bay, i. 190
Chestatta lake, ii. 446
Chesterfield inlet, ii. 304
Cheyennes Indians, ii. 570
Chicago, i. 198
Germans in, i. 207
population, i, 181
railways, i. 199
wheat market, ii. 485
Chicoutimi, ii. 366
Chignecto channel, ii. 295
Chilcotin river, ii. 441
Chilukweyuk river, ii. 445
Chinese, *the*, i. 211
character, i. 213
habits, i. 212
industry, i. 212
in the Pacific States, i. 215
social state, ii. 213
"Chinook" or dry winds, ii. 466
Chipewyan or Tinneh tribe, ii. 427, 569
Chudleigh or Chidley cape, ii. 295
Churchill river, ii. 304, 383, 424
Cincinnati, i. 196
Germans in, i. 207
Civil War, the American, i. 176
Claire lake, ii. 433
Clarke river, ii. 440
Clarke's Fork, Pend d'Oreille or Bitter Root river, ii. 439
Cleveland, i. 196
Clifton, ii. 548
Climate of California, i. 201
in Canada, ii. 453
of the Cordilleras, i. 45
near Mackenzie river, ii. 456
north shore of the St. Lawrence, ii. 456
near Pelly river, ii. 456
near Red river, ii. 456
south shore of the St. Lawrence and gulf, ii. 457
Clinton, ii. 444
Clingman peak, i. 7
Cordilleran plateau vegetation, i. 45
Coal, i. 159
Bellingham bay, i. 160
California, i. 161
Cordilleras, i. 159
Elk mountains, i. 159
Evanston, i. 160
Oregon, i. 161
Rocky mountains, i. 159
Upper Missouri, i. 159

Coal—
Vancouver island, i. 161; ii. 295
Washington territory, i. 161
Coal basins in Colorado, i. 160
New Mexican, i. 160
Northern, i. 159
Pacific, i. 160
Wyoming, i. 160
Coast, eastern, i. 3
Gulf, i. 2
Pacific, i. 3
Coast ranges, the, i. 45, 120; ii. 329
formations of, i. 134
Coats, account of Hudson bay by, ii. 301
Cobequid hills, ii. 329, 331
Coburg, ii. 369
Cockburn island, ii. 322
Collingwood, ii. 548
Colorado or Front range, i. 84
cañons, i. 94, 96
Chiquito or Flax river, i. 92
fauna of plateau, i. 102
flora of plateau, i. 102
gold and silver in, i. 136
parks of, i. 86
plateau region, i. 92
river, i. 41
table of silver yield, i. 157
Colounge lake, ii. 364
Columbia, British, area of, ii. 290
climate, ii. 294
gold in, ii. 294
population, ii. 290
Columbia river, ii. 438
gold in its tributaries, ii. 440
Combustion of pyritous shales, ii. 433
Comstock silver lode, i. 151
yield for seven years, i. 155
Constitution, Federal, i. 270
of the States and Territories, i. 272-3
district of Columbia, i. 273
Commerce—
cattle trade, ii. 533
decline of mercantile marine since the war, i. 267
increase of exports, i. 267
inland trade, i. 267
lumber trade, ii. 493
trade in petroleum, i. 19
trade of British Columbia, ii. 327
Comox district, ii. 326
Conception bay, ii. 626
Congress—
administration of justice, i. 272
the Cabinet, i. 274
component parts, i. 270
Congress—
executive, i. 271
President, i. 271
Cook's inlet, i. 278
Copper mines, ii. 504, 505
Coppermine river, ii. 320, 321, 470
Cordilleras, mountains, i. 40
Cordilleran plateau, i. 40
climate, i. 43
natural vegetation, i. 45
Cordilleran region, agricultural resources, i. 124
cattle and sheep raising, i. 125
geology of, i. 127
minerals of, i. 134
Cornwall, ii. 357
Coronation or Duke of York's gulf, ii. 320
Coteau Missouri, ii. 396
Cowitchan, ii. 326
Cranberry lake, ii. 439.
Crane island, ii. 360
Crataegus coccinea, ii. 400
Cree tribe, ii. 569
Cross lake, ii. 414, 446
Cumberland, Mr., ii. 517
house, ii. 394
river, i. 24
sound, ii. 322
"Custer's command," ii. 563
Customs of the Indians, i. 222
Cypress hills, ii. 397

DAIRY FARMING in Canada, ii. 494
Dairy produce in Canada, ii. 532
Dakota, gold and silver in, i. 136
Danes, the, i. 206
Darnley bay, ii. 320
Dartmouth, Halifax, ii. 582
Dauphin lake, ii. 350, 418
Davidson, Mr., report by, ii. 310
mount, i. 153
Davies, W. H., account of Esquimaux bay, ii. 300
Dawson, Dr. G. M., ii. 437, 471
Dease lake, ii. 435
strait, ii. 321
Death valley, i. 108
Decker lake, ii. 446
Deer Pond lake, ii. 627
Delaware, State of, ores in, i. 12
Demarcation point, ii. 451
Dénè-Dinjiè tribe, ii. 559
locations, ii. 559
numbers, ii. 560
Dennis, Lieut.-Col. J. S., report on Hudson Bay by, ii. 301, 309
Des Moines river, i. 24
Destruction of timber, i. 265
Detroit, i. 196
river, i. 34; ii. 352
Deux Montagnes lake, ii. 357
Diable, Monte, i. 120, 161
Diamond cape, ii. 359
Digby Gut, ii. 395
Digges islands, ii. 302
"Dirty Devil" river, i. 92
Divide, the continental, i. 91
Dixon's entrance, ii. 451
Dog river, ii. 434
Dolphin and Union strait, ii. 321
Dome, Black, i. 7
Douglas fir-trees, ii. 325, 489
Dove's charts, ii. 465
Dschenew, discoverer, i. 276
Dubaunt river, ii. 304
Dufferin cape, ii. 306
Dufferin, Lord, visit to and description of Manitoba by, ii. 345
Duke of York or Coronation gulf, ii. 320
Du Liard river, ii. 435
or River of the Mountains, ii. 435
Duluth wheat market, ii. 485
Du Rocher river, ii. 434
Duncan, Mr., ii. 473
Dutch, the, i. 205

"EAST MAIN," ii. 300
peninsula, ii. 301
river, ii. 305
East Tennessee, i. 6
Eastern townships, ii. 458
climate, ii. 459
products, ii. 459
Eboulemens mont, ii. 337
Echimamish river, ii. 415
Echinocystis lobata, ii. 400
Edinburgh, Industrial Museum of Canadian woods at, ii. 493
Edmonton, ii. 416
Education in America, i. 240
Egg lake, ii. 477
Elæagnus argentea, ii. 400
Elbert peak, i. 89
Elk range, i. 89
Ellesmere land, ii. 322
Embarras river, ii. 433
Equan river, ii. 305
Erie canal, ii. 511
lake, i. 32; ii. 350, 369, 370
Eriophorum polystachyon, ii. 402
Erskine sound, ii. 320
Eskimos, the, i. 278; ii. 323, 559, 560, 561
or Innoits tribe, ii. 559
character of, ii. 562
locations of, ii. 559
Esquimaux bay, ii. 299
Exploits, bay of, ii. 625
river of, ii. 627
Eyebrow mountain, ii. 396

FARGO, ii. 487
Father point, ii. 361

Federal Government, i. 273
Federal Union, the, i. 169
File hills, ii. 398
Finlay river, ii. 434
Firehole or Madison river, i. 64
"Five Nations" Indian Confederation, ii. 562
"Fish Spring," Yellowstone lake, i. 72
Fisheries in Canada, ii. 528, 555
  exports, ii. 529
  hatcheries, ii. 531
  table of fish varieties, ii. 530
  treaty with United States, ii. 529
Flatheads, Indians, ii. 569
Flathead lake, ii. 439
  river, ii. 439
Flemings, the, i. 206
Fleming, Sandford, C.E., ii. 382
Forests in Canada, ii. 488
  arctic shores, ii. 490
  Athabasca river, ii. 489
  British Columbia, ii. 489
  Dominion, the, ii. 490
  Fraser river, ii. 489
  Labrador, ii. 490
  list of habitats of trees, ii. 490
  Mackenzie river, ii. 489
  maples, sugar, ii. 491
  New Brunswick, ii. 552
  North Pacific shores, ii. 490
  Peace river, ii. 489
  Quebec, ii. 552
  Rocky mountains, ii. 490
  Saskatchewan, ii. 489
  specimens of wood at Kew Gardens, from Canadian, ii. 492
  varieties of trees, ii. 492
Fort Assiniboine, ii. 430
  Chipewyan, ii. 429
  Churchill, ii. 301
  Colville, ii. 440
  À la Corne, ii. 395
  Edmonton, ii. 424
  Ellice, ii. 290
  Frontenac, ii. 595
  Garry, ii. 418, 462
    Upper, ii. 421
  George, ii. 441
  Laramie, temperature, ii. 466
  Liard, ii. 436
  Norman products, ii. 470
  Pelly, ii. 290
  Shepherd, ii. 439
  Simpson, ii. 436
  Vermilion, heat at, ii. 465
  William, ii. 461, 569
    temperature of, ii. 461
  York, ii. 301
Fortin, P., ii. 525
Fortune bay, ii. 626
Fox channel, ii. 300
  size of, ii. 303
  strait, ii. 321
Fox island, ii. 321
François lake, ii. 441, 446
Franklin, Benjamin, i. 168
  bay, ii. 320
  strait, ii. 321
Franklin, Sir John, relics found, ii. 321
Fraser lake, ii. 446
  river, ii. 349, 350, 441, 444
Fredricton, New Brunswick, ii. 582
"Free Grant District," ii. 547
Fremont peak, i. 78
Frobisher bay, ii. 301
  or Hudson strait, ii. 321
Frog portage, ii. 425
Fruit-growing in Canada, ii. 495
Fuca, strait of, ii. 325
Fulica Americana, ii. 398
Fundy, bay of, ii. 295
  agricultural products, ii. 463
Fur trade, i. 279
Fury and Hecla strait, ii. 322

GALENA, productions of, i. 31
Gallatin river, i. 59
Galt, Sir Alexander, G.C.M.G., High Commissioner for Canada, account of Canada by, ii. 293
  account of Manitoba by, ii. 387
  on emigration, ii. 576
Gander Pond lake, ii. 627
Gander river, ii. 627
Gardiner's river, i. 75
Gaspé, ii. 297
Gatineau river, ii. 364
Genessee river, ii. 369
German populations, statistics of, i. 206
  emigration to America, i. 207
Germans, list of States inhabited by, i. 206
George river, ii. 303
George's island, ii. 581
Georgia, minerals in, i. 13
  strait of, ii. 441
Georgian bay, ii. 371
Geyser basins—
  Beehive, i. 65
  Castle, i. 66
  Firehole river, i. 64
  Giant, i. 67
  Giantess, i. 65
  Gibbon river, i. 71
  Grand, i. 67
  Grotto, i. 67
  Lower Geyser basin, i. 68
  Old Faithful, i. 65
  Red Mountain, i. 71
  Shoshone, i. 70
  The Minute Man, i. 71
Geyser basins—
  Turban, i. 67
  Wyoming, i. 59
  Yellowstone river, i. 71
Gibbon river, i. 71, 75
Gila river, i. 92
Gilbert, Sir Humphrey, ii. 605
Gillam's island, ii. 410
Goat island, i. 34
"Goblin City," i. 49
Gold in California, i. 138
  in Colorado, i. 142
  in the Cordilleras, i. 137
  in Dakota and Wyoming, i. 142
  formerly at Leadville, i. 158
  in Montana and Idaho, i. 142
  mining, methods of, i. 144
    hydraulic, i. 146
    quartz, i. 147
  prospecting for, i. 147
  a year's product of, i. 137
Gold Range mountains, ii. 441
"Grama" grass, i. 50
Grand island, i. 34
  lake, ii. 338
  river, i. 92; ii. 370
Grand Pond lake, ii. 627
  river, ii. 627
Grasses, species of prairie, ii. 402, 494
Gray's peak, i. 84
Great American desert, currents of air over, ii. 466
  basin, the, i. 42, 103, 130, 131
  Balsam mountains, i. 7
  Bear lake, ii. 422, 434
  Falls of the Missouri, i. 77
  Kanawha river, i. 24
  lakes, the, i. 32
    geology of region of, i. 38
  Manitoulin island, ii. 565
  Playgreen lake, ii. 412
  Salt lake, Utah, i. 106, 132
    analysis of the water, i. 107
  Slave lake, ii. 422
  Smoky mountains, i. 7
Great Plains, the, i. 47, 126
  arable land, i. 124
  cattle range of, i. 126
  fauna, i. 51
  geology, i. 54
  grazing on, i. 50
Green island, ii. 303, 361
  lake, ii. 447
  mountains, i. 6; ii. 329
  river, i. 78, 92
  river cañons, i. 96
Greenhorn or Wet mountains, i. 85

Grey Goose island, ii. 303
Grignet bay, ii. 625
Grinnell land, ii. 322
Grosse island, ii. 360
Grove, Calavaras, i. 123
Guelph, ii. 549
Gulf, Boothia, ii. 320
  Duke of York or Coronation, ii. 320
  of Mexico, i. 26
  Richmond, ii. 306
  St. Lawrence, ii. 297, 362
Gut of Canso, ii. 296
  Digby, ii. 295

HALDIMAND cove, ii. 594
Halifax, ii. 581
  harbour, ii. 296
  mean temperature, ii. 462
Hall, explorations by, ii. 322
Ham mountain, ii. 334
Hamilton, ii. 548
Hamilton inlet, ii. 299
  area of, ii. 299
Harbours—
  Canso, ii. 296
  Churchill, ii. 522
  Esquimault, ii. 325, 601
  Grand River, ii. 370
  Halifax, ii. 296, 581
  Kingston, ii. 594
  Leamington, ii. 370
  Lepreau, ii. 295
  Liverpool, ii. 296
  Louisbourg, ii. 296
  Lunenburg, ii. 296
  Miramichi, ii. 298
  Montreal, ii. 512, 587
  Nasse, ii. 437
  New Glasgow, ii. 298
  Pictou, ii. 298
  Port Colborne, ii. 370
  Port Dover, ii. 370
  Port Stanley, ii. 370
  St. John, ii. 295
  Shediac, ii. 298
  Shelburne, ii. 296
  Sydney, ii. 296
  Torbay, ii. 296
  Whitehaven, ii. 296
  Yarmouth, ii. 296
Hare bay, ii. 625
  island, ii. 361
Harrikanaw river, ii. 305
Harrison lake, ii. 443
  river, ii. 443
Harvard mount, i. 89
Havard, Dr. V., ii. 573
Hay lake, ii. 436
  river, ii. 436
Hayes river, ii. 305
Hazelton, Skeena river, ii. 449
Hearne, reports by, ii. 303
Hebron Mission, ii. 567
Hecla and Fury strait, ii. 322
Hector, Dr., ii. 397
Henrietta Maria cape, ii. 300
Henry mountains, i. 130
  house, ii. 430
Higgins, Professor D. F., ii. 462
Hills, Lake of the, ii. 433
Hind, Professor, ii. 381
Hochelaga, ii. 587
Holy Cross mountain, i. 89
Hood mount, i. 111
Hooker mount, ii. 340, 430
Hooker, Sir William, ii. 492
Hoosac mount, i. 269
Hope, ii. 443
Hopedale Mission, ii. 567
Hopewell chain of islands, ii. 306
Horetsky, Mr., ii. 314
Horse lake, ii. 447
"Hot springs" of Arkansas, i. 27
Hudson bay, ii. 300
  extent of, ii. 379
  general features, ii. 377
  ice in, ii. 311-16
  lakes around, ii. 345
  navigation in, ii. 311
  route, ii. 317
  tides in, ii. 311
Hudson Bay Company, ii. 307, 378
  table of ships of, ii. 313
Hudson river, i. 6
Hudson or Frobisher strait, ii. 301
  ice in, ii. 313
  navigation in, ii. 309
  tides in, ii. 312
Humber river, ii. 626
Humboldt river, i. 43, 105
Humulus Lupulus, ii. 400
Hungry Hall, ii. 424
Hurlbert, J. A., ii. 484
Hurlbert's *Atlas*, ii. 384
Huron, lake, i. 32, 33; ii. 350, 371, 461
  islands in, ii. 372
  river, ii. 370
Huron-Iroquois tribes, ii. 559
  history of, ii. 562
  locations, ii. 559
  numbers, ii. 560

IDAHO, gold and silver in, i. 136
Illinois basin coal-fields, i. 28
  river, i. 24
Immigrants, routes for, ii. 528
Immigration, general view, ii. 576
  number of children received from societies, ii. 579
  statistics, i. 207; ii. 577
Indians—
  in Alaska, i. 277
  in Canada, general notice of, ii. 557
  character, ii. 562
  customs of, i. 222
  former treaties with, ii. 564
Indians—
  games, ii. 568
  half-breeds, i. 231
  history of, ii. 562
  increase or decrease, ii. 558
  in islands in Arctic ocean and Hudson bay, ii. 560
  locations, ii. 559
  Métis or Mixed races, ii. 572
    character of, ii. 574
  missions, ii. 567
  mode of living, ii. 561
  Moquis, i. 220
  nomadic tribes, i. 220
  numbers, ii. 560
  observations on their condition, i. 224
  present condition, ii. 567
  Pueblos, i. 219
  recent treaties with, ii. 565
  schools for, ii. 566
  Sioux, i. 228
  on Skeena river, ii. 450
  statistics of, i. 218
  territory, i. 230
  traits of the, i. 221
  treatment of predatory tribes, i. 228
  tribes, ii. 559
    now civilised, i. 226
    uncivilised, i. 227
Inlet, Burrard, ii. 318, 445
  Chesterfield, ii. 304
  Cook's, i. 278
  Wager, ii. 303
Innoit or Eskimo tribe, ii. 559
Invertoke bay, ii. 299
Irish, number and position of the, i. 207
Iron, where found, i. 29
  mountain, i. 30
  ores, ii. 505
Iroquois Indians, *see* Huron-Iroquois
  history of, ii. 562
Iroquois or Richelieu river, ii. 367
Island, Anticosti, ii. 298, 361
  Agoomska, ii. 304
  Akpatok, ii. 303
  Aux Coudres, ii. 361
  Baffin land, ii. 322
  Banks land, ii. 321
  Boularderie, ii. 296
  Bizard, ii. 357
  Brier, ii. 295
  Cape Breton, ii. 296
  Charlton, ii. 304
  Cockburn land, ii. 322
  Crane, ii. 360
  Fox, ii. 321
  George's, ii. 581
  Gillam's, ii. 420
  Goat, i. 34
  Grand, i. 34
  Great Manitoulin, ii. 565

Island, Green, ii. 303, 361
Grey Goose, ii. 303
Grosse, ii. 360
Hare, ii. 361
Jesus, ii. 357
Kamouraska, ii. 361
King Charles, ii. 302
King William, ii. 323
Langley, ii. 289, 633
Long, ii. 303
Mansfield, ii. 302
Miquelon, ii. 289, 633
Montreal, ii. 357, 587
Navy, ii. 594
North Somerset, ii. 321
Nottingham, ii. 302
of Orleans, ii. 360
Parry, ii. 323
Perret, ii. 357
Petit Anse, i. 31
Pilgrims, the, ii. 361
Prince Edward, area of, ii. 290
Prince of Wales, ii. 322
Red, ii. 361
Resolution, ii. 301
Rhode, i. 14
Ross, ii. 413
Salisbury, ii. 302
St. George, i. 279
St. Helène, ii. 358
St. Helen's, ii. 588
St. Paul, i. 279
St. Pierre, ii. 289, 633
Seal, ii. 410
Southampton, ii. 303
Tory, ii. 305
Vancouver, ii. 325
Victoria and Albert land, ii. 321
Wolfe, ii. 356, 594
Islands, archipelago of, near Baffin bay, ii. 321
Aleutian, i. 280
in Arctic ocean and Hudson bay, area of, ii. 290
Brandy Pots, ii. 361
Button, ii. 302
Digges, ii, 302
French, ii. 289, 633
Hopewell chain of, ii. 306
Magdalen, ii. 298, 362
Manitounuck, chain of, ii. 306
Middle Savage, ii. 303
Mingan, ii. 298
Nastapoka, ii. 306
Queen Charlotte, ii. 326
Saddleback, ii. 303
Savage, ii. 302, 311
Snowyland, ii. 303
Southern Southampton, ii. 302
the "Thousand," ii. 356, 549
Upper Savage, ii. 311
Island portage, ii. 425
Islands, bay of, ii. 626
Isle à la Crosse, ii. 425
Isle Royale, i. 33; ii. 373
Islington Mission, ii. 419
Itasca lake, i. 21

JACQUES Cartier river, ii. 367
James, Captain, ii. 312
James bay, ii. 300, 304
size of, ii. 303
timber near, ii. 307
Japanese in California, i. 217
cultivation of tea, i. 217
mulberry trees, i. 217
Japanese current, the, or Kuro-Siwo, ii. 473
Jasper house, ii. 430
Jefferson river, i. 59
Jehovah People, account of the, i. 251
Jesus isle, ii. 357
Jones cape, ii. 300
coast near, ii. 304
islands near, ii. 305
Jornado del Muerto, i. 50

KABITOTIQUIA river, ii. 375
Kaministiquia river, ii. 347
Kamloops lake, ii. 442
Kamouraska island, ii. 361
Kanawha, Great, river, i. 24
Kane, explorations by, ii. 322
Kansas or Kaw river, i. 23
Kayoshk or Gull river, ii. 375
Kayuses Indians, ii. 569
Keepawa lake, ii. 338
river, ii. 363
Keewatin, ii. 289
Kent cape, ii. 321
Kentucky, ores in, i. 13
river, i. 24
Kew Gardens, Canadian wood in museum, ii. 492
Khogochaik bay, i. 278
Kildonan, ii. 487
Killisthenaux Indians, ii. 568
King Charles island, ii. 302
King William island, ii. 323
Kingston, Ontario, ii. 269, 594
forts, ii. 594
history, ii. 595
military college at, ii. 543, 595
population, ii. 595
Kispyox river, ii. 449
Kitsalas cañon, ii. 474
Kitseguecla river, ii. 449
Kitsumgallum river, ii. 450
Kitwungah, ii. 474
Klamath lakes, i. 132
Koksoak or South river, ii. 303
Kootanie or Flat Bow lake, ii. 439
river, ii. 438
Kosciusko, i. 168
Kullespelins, Indians, ii. 569

LABRADOR coast, ii. 299
exports, ii. 636
ice currents of, ii. 315
Labrador, temperature of, ii. 456
Labrador and Arctic watershed, Indians in, ii. 560
Lachine canal, ii. 587
Lacloche mountains, ii. 337
"Lacrosse," Indian game, ii. 568
Lac la Biche, ii. 477
Lac Plat, ii. 424
Lafayette, i. 168
La Grande portage, ii. 569
La Hache lake, ii. 447
Lake Albreda, ii. 442
Allumette, ii. 364
Anderson, ii. 443
Athabasca, ii. 422, 432
Aylmer, ii. 335
Babine, ii. 446
"Bras d'Or," ii. 296
Burns, ii. 446
Cedar, ii. 350, 393
Champlain, i. 6
Chestatta, ii. 446
Claire, ii. 433
Colounge, ii. 364
Cranberry, ii. 439
Cross, ii. 414, 446
A la Crosse, ii. 425
Dauphin, ii. 350, 418
Dease, ii. 435
Decker, ii. 446
Deer Pond, ii. 627
Deux Montagnes, ii. 357
Egg, ii. 477
Erie, i. 32, 38; ii. 350, 369
Flathead, ii. 439
François, ii. 441, 446
Fraser, ii. 446
Gander Pond, ii. 627
Grand, ii. 338
Grand Pond, ii. 627
Great Bear, ii. 422, 434
Great Playgreen, ii. 412
Great Slave, ii. 422
Green, ii. 447
Harrison, ii. 443
Hay, ii. 436
of the Hills, ii. 433
Horse, ii. 447
Huron, i. 32, 33; ii. 350
Itasca, i. 21
Kamloops, ii. 442
Keepawa, ii. 338
Kootanie or Flat Bow, ii. 439
La Hache, ii. 447
Lesser Slave, ii. 430
Long, ii. 397
Lower Arrow, ii. 439
M'Leod, ii. 426
Mamawa, ii. 433
Manitoba, ii. 350, 417
Matapedia, ii. 335
Memphramagog, ii. 335, 549
Megantic, ii. 335
Michigan, i. 32, 34; ii. 352

Lake Na-to-bun-kut, or Kitkoin, or Babine, ii. 446
Nicola, ii. 447
Nipigon, ii. 374, 556
Nipissing, ii. 338
Okanagan, ii. 438
Ontario, i. 32; ii. 350, 356, 368
Ootsabunkut, Upper and Lower, ii. 446
Pend d'Oreille, ii. 439
Pinchi, ii. 446
Pipestone, ii. 413
Pitt, ii. 443
Pyramid, i. 132
Quill, ii. 397
Rainy or Réné, ii. 347
Red Indian Pond, ii. 627
Reindeer, ii. 434
St. Clair, ii. 352
St. Francis, ii. 335
St. John, ii. 338, 366
St. Regis, ii. 357
Salt, i. 132
Seton, ii. 443, 444
Shebandowan, ii. 347
Shoal, ii. 349
Simpson, ii. 435
Sipi-wesk, ii. 414
Soda, i. 109
Stuart, ii. 446
Sturgeon, ii. 480
Superior, i. 32, 33, 39; 350, 372
Tacla, ii. 441, 446
Tchesinkut, ii. 446
Temagamang, ii. 338
Temiscamang, ii. 338, 363
Temiscouata, ii. 335
Tezzer, ii. 446
Victoria, ii. 477
White-fish, ii. 424
Winnipeg, ii. 348, 350, 416, 422
Winnepegosis, ii. 350, 417
of the Woods, i. 33; ii. 347, 422
Woolaston, ii. 434
Yellow Head, ii. 441
Yellowstone, i. 72
Lakes, the, ii. 446
Great, the, i. 32, 38
Great and Little Shushwap, ii. 443
Great Salt, Utah, i. 106, 132
Klamath, i. 132
Old Wives, ii. 403
Upper Arrow, ii. 443
Lakelse river, ii. 450
Lancaster sound, ii. 322
Langlands river, ii. 306
Langley, ii. 445
La Plata Mount, i. 89
Laprairie, ii. 512
Laramie plains, i. 86
range, i. 84
La Rivière Sal, ii. 422
Larix Americana, ii. 307
Lassen's peak, i. 116
Laurentide mountains, ii. 329, 335
Lead, where found, i. 30
Leadville, Colorado, i. 158
Leather or Yellowhead mountains, ii. 429
Lefroy, Col., ii. 470
Lewis or Snake river, ii. 440
Liard river, ii. 426
Lièvre, Du, river, ii. 364
Lilloet range mountains, ii. 444
river, ii. 443
Upper, ii. 443
Lincoln mount, i. 88
Lindley, Mr., ii. 492
Llano Estacado, or Staked Plain, i. 48
"Lloyds," Canadian woods at, ii. 493
London, England, table of a year's temperature, ii. 455
Long island, ii. 303
Island sound, ii. 305
lake, ii. 397
point, fowl at, ii. 370
Long-Sault, ii. 363
Long's peak, i. 84
Lorette village, ii. 563
Louisbourg, ii. 606
Louisiana, salt deposits, i. 27, 31
Lower Arrow lake, ii. 439
Lumber trade, the, ii. 493
Lütke, tables of temperature by, ii. 472
Lyell, Sir Charles, ii. 355
Lytton, ii. 442

MACKENZIE, Sir Alexander, ii. 431
Mackenzie bay, ii. 320
Mackenzie river, ii. 320, 321, 349, 350, 426
climate, ii. 469
islands in, ii. 429
products, ii. 470
or Slave river, ii. 427
or Stony river, ii. 427
M'Clintock channel, ii. 323
M'Clure, Sir Robert, ii. 319
Macdonald, Sir John A., K.C.B., ii. 406
M'Gregor, Mr., 360
M'Intyre bay, ii. 375
Mackinaw or Michilimacinac, strait of, ii. 371, 372
M'Leod lake, ii. 426
Macoun, Professor, account of the Saskatchewan region by, ii. 397-404
Madawaska river, ii. 364
Madison river, i. 59
Magdalen islands, ii. 298, 362
Mahogany trees, i. 265
Maine, iron in, i. 14
Mamawa lake, ii. 433
Manicouagan river, ii. 336
Manitoba, area of, ii. 290
account of, ii. 346
Manitoba, Indians in, ii. 560
lake, ii. 350
Métis in, ii. 573
population, ii. 290
settlers in, 387
Manitounuck chain of islands, ii. 306
sound, ii. 306
Mansfield island, ii. 302
Manufactures, i. 266
Marcy or Taharus mount, i. 7
Markham, Clement B., C.B., on Polar expeditions, ii. 318
explorations by, ii. 322
Marquette, i. 33
Maryland, ores in, i. 12
Massive mount, i. 89
Massiwaiba river, ii. 305
Matanne river, ii. 334
Matapedia lake, ii. 335
Matawan river, ii. 364
Matta-gami river, ii. 305
Maumee river, ii. 370
Medecine Bow mountains, i. 128
Megantic lake, ii. 335
Melville cape, ii. 321
peninsula, ii. 303
Memphramagog lake, ii. 335, 549
Merced river, i. 117
Mergus serriator, ii. 398
Merritt, W. H., ii. 516
Mestigoes, half-breed Indians, i. 231
"*Meta Incognita*," ii. 302
Methy portage, ii. 430
or à la Loche, ii. 431
Metla Katla, ii. 473
Mexican campaign, i. 170
Mexico, gulf of, i. 26
Michigan basin coal-fields, i. 28
lake, i. 32, 34
ores, i. 27
Middle park, i. 86
Savage islands, ii. 303
Miette river, ii. 430
Milford Haven, ii. 296
Mille Lacs, ii. 420
"Mine La Motte," lead-mine, i. 31
Mines in Canada, ii. 501
Minerals in Canada, ii. 501
Mingan islands, ii. 298
Minnesota climate, ii. 468
river, i. 24
Mississaga point, ii. 594
Mississippi basin, the, i. 24, 26
river, i. 20
Lower, i. 23
Upper, i. 23
valley climate, ii. 459
extent, i. 20
coal-fields, i. 27
geology, i. 25
minerals, i. 26

Missouri basin coal-fields, i. 29
compromise, the, i. 175
Great Falls of, i. 77
ores, i. 27
range, i. 58
river, i. 23
valley, i. 77
Mitchell's peak, i. 7
Mount Adams, i. 112
Baker, i. 111; ii. 600
Bross, i. 157
Brown, ii. 340, 430
Davidson, i. 153
Eboulemens, ii. 337
Harvard, i. 89
Hood, i. 111
Hooker, ii. 340, 430
Hoosac, i. 269
La Plata, i. 89
Lincoln, i. 88, 157
Marcy or Taharus, i. 7
Massive, i. 89
Ouray, i. 89
Princeton, i. 89
Rainier, i. 111
Royal, ii. 588
St. Elias, i. 111; ii. 452
St. Helens, i. 111
Shasta, i. 111
Shavano, i. 89
Tolmie, ii. 600
Washington, i. 6
Whitney, i. 133
Yale, i. 89
Mountain, Broughton, ii. 334
Cedar, ii. 600
Eyebrow, ii. 396
Ham, ii. 334
Holy Cross, i. 89
Iron, i. 30
Orford, ii. 334
St. Ronan's, ii. 334
Sutton, ii. 334
Thunder-breeding, ii. 396
Mountains, Adironacks, i. 6; ii. 329, 339
Aliaskan range, i. 277
Alleghanies, i. 7; ii. 329
Amargosa range, i. 108
Appalachian, i. 5; ii. 329
Avalon, ii. 627
Big Horn, i. 82
Bitter Root range, i. 58
Black, i. 7
Black hills, i. 47
Blue Ridge, i. 7
Cariboo, ii. 443
Cascade, i. 40
range, i. 110; ii. 329, 343
or St. Elias range, i. 277
Coast ranges, i. 120; ii. 329, 343
Colorado or Front range, i. 84
Cordilleras, i. 40
Elk range, i. 89
Great Balsam, i. 7
Mountains—
Great Smoky, i. 7
Green, i. 6; ii. 329
Gold range, ii. 441
Henry, i. 130
Lacloche, ii. 337
Laramie range, i. 84
Laurentide, ii. 329, 335
Lillooet range, ii. 444
Medicine Bow, i. 128
Missouri range, i. 58
Notre-Dame, i. 6; ii. 331
Olympian, British Columbia, ii. 600
Pacific ranges, i. 110
Panamint range, i. 108
Park range, i. 82, 88
Pembina, ii. 420
Placiere, i. 160
Porcupine, ii. 418
Riding, ii. 418
Rochers Deboule's range, ii. 449
Rocky, i. 57; ii. 340
extent of, i. 127; ii. 329
geology of, i. 128
southern, i. 83
Romanzoff, i. 277
St. Elias or Cascade range, i. 277
San Francisco, i. 130
Sangre de Cristo range, i. 85
San Juan range, i. 90
Sawatch or "Sierra Madre" range, i. 89
Selkirk, ii. 343
range, ii. 442
Shickshock, ii. 333
Sweetwater range, i. 42
"Three Buttes," i. 81
Vermont range, i. 6
Wahsatch range, i. 103
Wet or Greenhorn, i. 85
White, i. 6
of Coleraine, ii. 334
Wind river, i. 78
Yellowhead or Leather, ii. 429
Yellowstone ranges, i. 78
Zuni, i. 90
Monte Diable, i. 120, 161
Montreal, ii. 358, 546, 587
churches, ii. 591
former seat of Government of Canada, ii. 590
history of, ii. 589
houses in, ii. 590
island, ii. 357, 587
population, ii. 590
railway, ii. 512
river, ii. 363
royal visits, ii. 591
or "Ville Marie," ii. 589
Mormonism, account of, i. 252
its constitution, i. 257
effect of Pacific Railway on the community, i. 260
Mormonism—
future prospects, i. 259
Mormons at Nauvoo, i. 254
polygamy, i. 257
schism appears, i. 258
settlement in Utah, i. 255
Joseph Smith, founder, i. 253
Brigham Young, successor, i. 255
Moisie river, ii. 336
Monongahela river, i. 24
Montana, gold and silver in, i. 136
Montmorenci river, ii. 367
Moose Factory anchorage, ii. 307
river, ii. 305
"Moose woods," the, ii. 396
Moravian missions, ii. 300, 567
Morris, Governor, anecdote of, ii. 566
Mosquito bay, ii. 307
Mossy portage, ii. 418
Mound-builders, ancient, i. 282
Mullock, Rev. Dr., ii. 483
Muskoka country, ii. 547
Musk-ox, i. 54
Mushrooms, ii. 403

NAIN Mission, ii. 567
Na-me-wa-min-i-kan or Sturgeon or Poplar Lodge river, ii. 375
Nanaimo, i. 161; ii. 326
Nares, explorations by, ii. 322
"Narrows," the, ii. 634
Nastapoka river, ii. 306
islands, ii. 306
Nation river, ii. 434
National debt of America, i. 269
Navy island, ii. 594
Nechaco, Lower, lake, ii. 475
Nechaco river, ii. 441
Negroes, the, i. 209
present condition, i. 210
recognition by law, i. 211
slaves, i. 172
Nelson district, ii. 326
river, ii. 304, 350, 408
survey of, ii. 409-416
upper part, ii. 412
Nevada, gold and silver in, i. 136
Sutro tunnel in, i. 155
Newfoundland, ii. 625
agricultural capabilities, ii. 629, 632
area of, ii. 290, 625
"barrens," ii. 626
climate, ii. 483, 628
cod-fisheries, ii. 630
copper mines, ii. 628
dog, the, ii. 630
exports, ii. 631, 635
fisheries and treaties, ii. 633

Newfoundland—
fishing-grounds, i. 164
fogs, true account of the, ii. 628
fresh-water ponds, ii. 627
geology, ii. 627
imports, ii. 630
Legislature, the, ii. 631
mean temperature, ii. 628
minerals, ii. 627
population, ii. 290, 633
rivers, ii. 626
seal-fishing, ii. 630
timber, ii. 629
waters, steamers in, ii. 314, 631
New Archangel, i. 278
New Brunswick, ii. 506
albertite coal, ii. 507
area of, ii. 290
Indians in, ii. 560
ores in, ii. 506
population, ii. 290
New Edinburgh, Ottawa, ii. 594
New England, anthracite in, i. 15
States, ores in, i. 14
New Englanders, i. 204
New Hampshire, ores in, i. 14
New Jersey, minerals in, i. 12
New Mexico, gold and silver in, i. 136
Indians settled in, i. 218
New Orleans, population, i. 181
New Westminster, British Columbia, ii. 437, 445, 602
climate, ii. 602
fishing, ii. 602
population, ii. 602
New York city, i. 183
commerce, i. 185
education, i. 185
formerly New Amsterdam, i. 165
Germans in, i. 207
Irish in, i. 208
population, i. 181, 186
State of, ores in, i. 12
Niagara town, ii. 369, 548
escarpment, ii. 339
falls, the, i. 34; ii. 353
river, i. 34; ii. 353
Nicola lake, ii. 447
river, ii. 447
Nipigon lake, ii. 374, 556
Nipissing lake, ii. 338
Noddawai river, ii. 305
Nonwatan river, ii. 375
Noot Sakh, the, ii. 445
North American colonies, i. 164
North bay, ii. 302
North bluff, ii. 311
North Carolina, ores in, i. 13, 17
North cape, ii. 297
North Platte river, i. 84
North park, i. 86
North Polar sea, conjectures respecting, ii. 318
explorations in, ii. 319, 322
magnetic pole, ii. 319
North river, ii. 305
North Somerset island, ii. 321
North-West territory, ii. 381
account of, ii. 464
agricultural capabilities, ii. 381
area of, ii. 290
climate, ii. 463
fertility of the, ii. 379
forests, ii. 488
fuel supply, ii. 405
population, ii. 290
seasons in, ii. 467
stock-raising, ii. 407
table of acres appropriated in the, ii. 580
wheat-fields, ii. 484-88
Norwegians, the, i. 206
Notre Dame bay, ii. 625
mountains, i. 6; ii. 331
Nottingham island, ii. 302
Nova Scotia, area of, ii. 290
climate, ii. 462
Indians in, ii. 560
minerals in, ii. 508
petroleum wells, ii. 509
population, ii. 290, 536
products, ii. 462
valley of, ii. 331

OAK trees in the Sierra, i. 122
Ogden river, i. 104
Oggotika river, ii. 305
Ohio valley climate, ii. 459
river, i. 23
Ojibiweyuk, Indians, ii. 568
Okanagan lake, ii. 438
Okkak Mission, ii. 567
Old Wives lakes, ii. 403
Olympia, Puget sound, ii. 600
Olympian mountains, ii. 600
Ombabika bay, ii. 374
Omineca gold mines, ii. 450
"Omnibus Bill," the, i. 175
Ontario, area of, ii. 290
climate, ii. 461
copper mines, ii. 504
"Free Grant District" at, ii. 547
fruits, ii. 460
Indians in, ii. 560
iron ore, ii. 505
lake, i. 32; ii. 350, 356, 368
petroleum, ii. 502
population, ii. 290
Ootsabunkut lake, Upper and Lower, ii. 446
Oregon, gold and silver in, i. 136
Orford mountain, ii. 334
Orleans, island of, ii. 360
Oswego river, ii. 369
Ottawa, ii. 546, 592
Ottawa or Bytown, ii. 365, 593
Chaudière Falls of, ii. 364
Colonel By, ii. 365, 593
Government House, ii. 594
Houses of Parliament, ii. 593
population, ii. 592
river, ii. 336, 363
situation, ii. 592
timber, ii. 365
Otter-hunt in Aleutian islands, i. 279
Ouray mount, i. 89
Outarde or Bustarde river, ii. 336
Owl's Head peak, ii. 334

PACIFIC coast, length of, ii. 324
general account, ii. 324
great archipelago, ii. 324
ranges, general view of, i. 110
Palliser, Captain, R.E., ii. 382
Panamint range, i. 108
Park, Baker's, i. 90
National, i. 59, 76
North, i. 86
Middle, i. 86
Range mountains, i. 82, 88
South, i. 86
Parks of Colorado, i. 86
Paria river, i. 92
Parr, explorations by, ii. 322
Parry, Sir Edward, account of Hudson bay, ii. 311
chart, ii. 311
explorations, ii. 312, 319
islands, ii. 323
Parsnip river, ii. 434
Partridge hill, ii. 415
Paspebiac, ii. 526
Pas Mission, ii. 394
Pasquia river, ii. 394
Passes in Canada—
Athabasca, ii. 429
Athabasca portage, ii. 340
Kicking Horse, ii. 439
Leather, ii. 342, 430, 441
Tejon, i. 116
Vermilion, ii. 341
Patapsco river, i. 190
Pawnees Indians, ii. 570
Peace river, ii. 426, 434
or Ungigah, ii. 434
district, ii. 290, 476
valley, ii. 478
Peak, Buffalo, i. 88
Elbert, i. 89
Fremont, i. 78
Gray's, i. 84
Lassen's, i. 116
Long's, i. 84
Mitchell's or Clingman, i. 7
Owl's Head, ii. 334
Pike's, i. 84

Peak, Quandary, i. 88
Sherman, i. 112
Sugar Loaf, ii. 334
Peaks, Spanish, i. 85
Pecos river, i. 48
valley, i. 160,
Pediœcetes phasianellus, ii. 401
Peel river, ii. 426
Pelican, Swan, or Clearwater river, ii. 431
Pelly river, ii. 451
Pemberton portage, ii. 443
Pembina mountains, ii. 420
Pend d'Oreille lake, ii. 440
Peninsula, Boothia Felix, ii. 320, 323
East Main, ii. 301
Labrador, ii. 299
Melville, ii. 303
Penn, William, i. 166
Pennsylvania, anthracite in, i. 15, 17
mineral wealth of, i. 11
Penstemon, ii. 402
Perfectionists, account of the, i. 251
Perouse, Admiral, ii. 308
Perrot island, ii. 357
Petawahweh river, ii. 364
Petit Anse island, i. 31
ancient remains found, i. 32
Petroleum, where found, i. 18
in California, i. 135
in Nova Scotia, ii. 508
in Pennsylvania, i. 135
statistics of, ii. 503
trade in, i. 19
Petrolia town, ii. 503
Philadelphia, i. 186
chief manufacturing city, i. 189
exports, i. 189
formerly the capital, i. 190
Germans in, i. 188, 207
population, i. 181
public buildings, i. 188
streets in, i. 187
Philpot, Dr. Harvey J., ii. 539
Phosphate of lime or apatite, statistics of, ii. 506
Piegans Indians, ii. 570
Pike's peak, i. 84
Pilgrims, the, island, ii. 361
Pilot Knob mountain, i. 30
Pinchi lake, ii. 446
Pine river, ii. 435, 477
Pines in the Sierra, i. 122
Pinus ponderosa, ii. 490
Pipestone lake, ii. 413
Pitt lake, ii. 443
river, ii. 443
Pittsburg, i. 196; ii. 595
Placiere mountains, i. 160
Plain, Staked, i. 48
Plains in British America, i. 49
Great, i. 47, 126
Laramie, i. 86
Snake river, i. 81
Plateau, Cordilleran, i. 40
Colorado, i. 92
on the "divide," i. 82
region, i. 128; ii. 330
or Colorado plateau, i. 129
Platte river, i. 23
North, i. 84
South, i. 84
Podilymbus podiceps, ii. 398
Point Father, ii. 361
Frederick, ii. 594
Douglas, ii. 422
Henry, ii. 594
Levi, ii. 585
de Monts, ii. 361
Pontiac, ii. 563
Populus tremuloides, ii. 385
Population of America, i. 203
Acadia, ii. 535, 536
Anticosti island, ii. 298
Baltimore, i. 181
Belleville, ii. 603
Boston, i. 181
Brantford, ii. 603
British Columbia, ii. 290 and Vancouver island, ii. 538
Brockville, ii. 603
Brooklyn, i. 181
Canada, ii. 293, 535, 536
Cape Breton, ii. 536
Charlottetown, ii. 602
Chatham, ii. 603
Chicago, i. 181
comparative, of chief cities, i. 180
Emerson, ii. 603
Fredricton, ii. 583, 602
Galt, ii. 603
Great Prairie territory, ii. 290
Guelph, ii. 603
Halifax, ii. 536, 602
Hamilton, ii. 536, 602
Hull, ii. 602
Indian, ii. 535
islands in the Arctic ocean and in Hudson bay, ii. 290
Keewatin, district of, ii. 290
Kingston, ii. 536, 595, 603
Labrador, ii. 290
Levis, ii. 602
Lindsay, ii. 603
London, ii. 536, 603
Manitoba, ii. 290 and British Columbia, ii. 536
Montreal ii 590, 602
Newfoundland, ii. 290, 535, 538, 633
New Brunswick, ii. 290, 536, 538
New France (Quebec), ii. 535, 536
New Orleans, i. 181
New York, i. 181
Population of New Westminster, ii. 603
North-West territories, ii. 290
Nova Scotia, ii. 290, 536, 538
Ontario, ii. 290, 536, 538
Ottawa, ii. 536, 592, 603
Peterboro', ii. 603
Philadelphia, i. 181, 186
Port Hope, ii. 603
Port Royal, ii. 535
Prince Edward island, ii. 290, 536, 538
Quebec, ii. 290, 536, 602
Rupert's land and Red River settlement, ii. 538
St. Catherines, ii. 603
St. Henri, ii. 602
St. Hyacinthe, ii. 602
St. John, ii. 536, 584
St. John, New Brunswick, ii. 602
St. John's, Newfoundland, ii. 535, 603
St. Louis, i. 181
St. Thomas, ii. 603
San Francisco, i. 181
Sherbrooke, ii. 602
Sorel, ii. 602
per square mile, ii. 539
statistics, ii. 535-9
Stratford, ii. 603
Summerside, ii. 602
tables of, ii. 535, 536
Three Rivers, ii. 602
Toronto, ii. 536, 597, 602
United States, i. 179
Victoria, Vancouver, ii. 603
Washington, i. 181
Windsor, ii. 603
Winnipeg, ii. 599, 603
Woodstock, ii. 603
Porcupine or Stone river, ii. 434, 451
mountains, ii. 418
Portage de la Traite, or Frog portage, ii. 431
Port Essington, ii. 474
Hood, ii. 297
Hope, ii. 369
Nelson route, ii. 317
Portland, Oregon, ii. 600
channel, ii. 451
Powder river, i. 82
Prairie region, ii. 382
country of the West, ii. 462
description, ii. 390
extent of, ii. 383
Grand, the, ii. 481
infertile region, ii. 396
prairie dog, i. 53
produce, ii. 386
river system, ii. 383
timber, ii. 385
vegetation, ii. 384, 462 494

Prairies, the, i. 25
Prescott, ii. 484, 547
President of the United States, first, i. 169
Prince Albert, ii. 290
  Edward island, area of, ii. 290
    Indians in, ii. 560
    population, ii. 290
    products, ii. 458
  Henry foreland, ii. 302
  of Wales island, ii. 321
  William, stibnite at, ii. 507
Princeton mount, i. 89
Provo or Timpanogos river, i. 104
Prunus Americana, ii. 400
  Virginiana, ii. 400
Puck-wa-ha-gun river, ii. 411
Puget sound, ii. 600
Pyramid lake, i. 132

QUANDARY peak, i. 88
Qu'Appelle river, ii. 290, 397
  plains near, ii. 403
Quatres Fourches river, ii. 435
Quatsalix cañon, ii. 474
Queen Charlotte islands, ii. 326
  agricultural possibilities, ii. 472
  climate, ii. 327
  forests, ii. 327
Quebec, ii. 359, 546, 585
  area of, ii. 290
  French inhabitants, ii. 586
  history of, ii. 586
  Indians in, ii. 560
  ores in, ii. 506
  origin of name, ii. 585
  Plains of Abraham, ii. 585
  population, ii. 290, 585
  or Stadacona, ii. 586
  university, French, ii. 586
Quesnelle river, ii. 442
Quill lake, ii. 397

RACE cape, ii. 625
  rocks, the, ii. 325
Railway bridges, ii. 520
Railways in Canada, ii. 512
  Canada Southern, ii. 518
  Canadian Pacific, ii. 518
  European and North American, ii. 517
  Grand Trunk, ii. 515
  Great Western, ii. 515
  London and Port Stanley, ii. 516
  New Brunswick and Canada, ii. 517
  Northern, ii. 517
  Nova Scotia, ii. 517
  Quebec, Montreal, Ottawa, and Occidental, ii. 518
Railways in Canada—
  routes projected, ii. 521
  Welland, ii. 516
  Western Extension, ii. 517
Rainfall in Arkansas, ii. 494
  California, i. 121
  Mississippi, west of, ii. 494
  New Mexico, ii. 494
  Texas, ii. 494
Rainier mount, i. 111
  or Tachoma glaciers, i. 112
Rainy or Réné lake, ii. 347
  river, ii. 423
Raisin river, ii. 370
Raleigh, Sir Walter, founded colony in Virginia, i. 164
Randolph co., gold in, i. 14
Rapids of the St. Lawrence, ii. 357
Rat Portage, ii. 419
  river, ii. 420
Raton hills, i. 160
Ray cape, ii. 297, 625
Recarees Indians, ii. 570
Red Deer river, ii. 417
Red Mountain springs, i. 71
Red Indian Pond lake, ii. 627
Red island, ii. 361
Red river, ii. 417, 420
Red river, the, of Louisiana, i. 23
Reindeer, i. 54; ii. 427
Reindeer lake, ii. 434
Reno, i. 153
Resolution island, ii. 301
Rhode island, coal in, i. 14, 15
Richardson, Sir John, ii. 432, 470
Richardson, Dr., ii. 386
Richelieu or Iroquois river, ii. 367
Richmond gulf, ii. 306
Rideau canal, ii. 595
  river, ii. 364
Riding mountains, ii. 418
Rigoulette, ii. 299
Rio Grande del Norte, i. 87
Rivers—
  Abittibe, ii. 305
  Albany, ii. 305
  Alleghany, i. 24
  Amur, i. 278
  Arkansas, i. 23, 128
  Assiniboine, ii. 400
  Athabasca, ii. 422, 426, 429
  Attahwahpiskat, ii. 305
  Babine or Simpson, ii. 437
  Back or Great Fish, ii. 320, 321
  Battle, ii. 290
  Bear, i. 104
  Belly, ii. 290
  Betsiamite, ii. 336
  Big, ii. 305
  Big Horn, i. 82
Rivers—
  Birkenhead, ii. 443
  Black, ii. 364
  Black or Westroad, ii. 441
  Bow, ii. 290, 407
  Canadian, i. 24
  Canoe, ii. 438
  Cayoush, ii. 444
  Cedar, i. 24
  Chatte, ii. 334
  Chaudière, ii. 367
  Chilcotin, ii. 441
  Chilukweyuk, ii. 445
  Churchill, ii. 304, 383, 424
  Clarke, ii. 440
  Colorado, Chiquito or Flax, i. 41
  Columbia, ii. 438
  Coppermine, ii. 320, 321
  Cumberland, i. 24
  Des Moines, i. 24
  Detroit, i. 34; ii. 352
  Dog, ii. 434
  "Dirty Devil," i. 92
  Dubaunt, ii. 304
  Du Lièvre, ii. 364
  Du Rocher, ii. 434
  East Main, ii. 305
  Echimamish, ii. 415
  Embarras, ii. 433
  Equan, ii. 305
  of Exploits, ii. 627
  Finlay, ii. 434
  Flathead, ii. 439
  Fraser, ii. 350, 441, 444
  Gallatin, i. 59
  Gander, ii. 627
  Gardiner's, i. 75
  Gatineau, ii. 364
  Genessee, ii. 369
  George, ii. 303
  Gibbon, i. 71, 75
  Gila, i. 92
  Grand, i. 92
  Grand Pond, ii. 627
  Great Kanawha, i. 24
  Green, i. 78
  Harrikanaw, ii. 305
  Harrison, ii. 443
  Hay, ii. 436
  Hayes, ii. 305
  Hudson, i. 6
  Humber, ii. 626
  Humboldt, i. 43, 105
  Huron, ii. 370
  Illinois, i. 24
  Jacques Cartier, ii. 367
  Jefferson, i. 59
  Kabitotiquia, ii. 375
  Kaministiquia, ii. 347
  Kansas or Kaw, i. 23
  Kayoshk or Gull, ii. 375
  Keepawa, ii. 363
  Kentucky, i. 24
  Kispyox, ii. 449
  Kitseguecla, ii. 449
  Kitsumgallum, ii. 450
  Koksoak or South, ii. 303
  Kootanie, ii. 438

Rivers—
Lakelse, ii. 450
Langlands, ii. 306
Lesser Slave, ii. 430
Lewis or Snake, ii. 440
Liard, ii. 426, 434, 451
Lilloet, ii. 443
Upper, ii. 443
Little Whale, ii. 305
Lower Mississippi, i. 23
Mackenzie, ii. 320, 321, 350, 426
Madawaska, ii. 364
Madison, i. 59
Manicouagan, ii. 336
Massiwaiba, ii. 305
Matanne, ii. 334
Matawan, ii. 364
Matta-gami, ii. 305
Maumee, ii. 370
Merced, i. 117
Miette, ii. 430
Minnesota, i. 24
Mississippi, i. 20
Missouri, i. 23
Moisie, ii. 336
Monongahela, i. 24
Montmorenci, ii. 367
Montreal, ii. 363
Moose, ii. 305
Na-me-wa-min-i-kan or Sturgeon or Poplar Lodge, ii. 375
Nastapoka, ii. 306
Nation, ii. 434
Nechaco, ii. 441
Nelson, ii. 304, 350, 408
Niagara, i. 34; ii. 353
Nicola, ii. 447
Noddawai, ii. 305
Nonwatan, ii. 375
North, ii. 305
Ogden, i. 104
Oggotika, ii. 305
Ohio, i. 23
Okanagan, ii. 438
Oswego, ii. 369
Ottawa, ii. 336, 363
Outarde or Bustard, ii. 336
Paria, i. 92
Parsnip, ii. 434
Pasquia, ii. 394
Patapsco, i. 190
Peace, ii. 426, 434
Pecos, i. 48
Peel, ii. 426, 451
Pelican or Swan or Clear-water, ii. 431
Pelly, ii. 451
Petawahweh, ii. 364
Pine, ii. 435
Pitt, ii. 443
Platte, i. 23
Porcupine, ii. 451
Powder, i. 82
Provo or Timpanagos, i. 104
Puck-wa-ha-gun, ii. 411
Qu'Appelle, ii. 290, 397
Quatres Fourches, ii. 435
Quesnelle, ii. 442
Rainy or Réné, ii. 423
Raisin, ii. 370
Rat, ii. 420
Red, ii. 417, 420
Red, of Louisiana, i. 23
Red Deer, ii. 417
Richelieu or Iroquois, ii. 367
Rideau, ii. 364
Rio Grande del Norte, i. 87
Rock, i. 24
Rupert, ii. 305
Saguenay, ii. 336, 361, 366
Sandusky, ii. 370
Ste. Anne des Monts, ii. 334
St. Clair, i. 34; ii. 352
St. Francis, ii. 367
St. Francis, Arkansas, i. 23
St. John, ii. 582
St. Lawrence, i. 32, 38; ii. 350, 356, 585
St. Marie, i. 33
St. Maurice, ii. 365
Salmon, i. 81
San Juan, i. 92
Saskatchewan, ii. 294, 350, 391
Great and Little, ii. 416
Seal, ii. 305
Severn, ii. 305
Sevier, i. 105
Shuswap, ii. 447
Similkameen, ii. 438
Skeena, ii. 437, 448, 475
Smoky, ii. 435
Snake, i. 79
Souris, ii. 290
South Platte, i. 128
Saskatchewan, ii. 290
Thompson, ii. 443
Stickeen, ii. 437
Stone, ii. 433
Stuart, ii. 441
Sumass, ii. 445
Suskwa, ii. 450
Swan, ii. 417
Sweetwater, i. 82
Tennessee, i. 24
Terra Nova, ii. 626
Thompson, ii. 442
Timpanogos or Provo, i. 104
Tongue, i. 82
Trent, ii. 369
Trout, ii. 305
Uinta, i. 92
Upper Mississippi, i. 23
Vermilion, ii. 435
Virgen, i. 92
Wabash, i. 24
Waterhen, ii. 418
Wat-son-kua, ii. 449
Weber, i. 104
Weenisk, ii. 305
Whale, ii. 303
Whirlpool, ii. 430
White, i. 24, 92
William's fork, i. 92
Wind, i. 78
Winnipeg, ii. 418, 419
Wisconsin, i. 24
Yampa, i. 92
Yazoo, i. 23
Yellowstone, i. 23
Yukon, i. 277; ii. 451
Rivière du Sud, ii. 360
Rivière la Biche, ii. 477
Robertson-Ross, Col. P., ii. 543
Roberval, ii. 605
Robson, account of Hudson bay by, ii. 310
Rochers Deboule's range, ii. 449
"*Roches-moutonnées*," i. 79
Rock river, i. 24
Rocky mountains, i. 57; ii. 340
extent of, i. 127; ii. 328, 340
glaciers in, i. 79
southern, i. 83
Romanzoff mountains, i. 277
Rosa blanda, ii. 400
Ross, explorations by, ii. 319
Ross island, ii. 413
Route, Douglas, ii. 444
Routes—
Hudson bay, ii. 317
for immigrants, ii. 523
Liverpool to Japan, two routes, ii. 317
Port Nelson, ii. 317
Royal mount, ii. 358, 588
Royale isle, i. 33
"Running a rapid," i. 100
Rupert river, ii. 305
Rupert's land, Indians in, ii. 560
metropolitan of, ii. 599
Russell, Lindsay, ii. 404
Russian America or Alaska, i. 276
Russo-Germans, the, i. 206

SABLE cape, ii. 330
Sacramento valley, i. 121
Saddleback cape, ii. 310
islands, ii. 303
"Sage brush," or Artemisia, i. 50
Saginaw bay, i. 33; ii. 372
Ste. Anne des Monts, ii. 334
St. Anthony, falls of, i. 21
St. Catherine's, ii. 548
St. Clair lake, ii. 352
river, i. 34; ii. 352
St. Elias or Cascade range, i. 277
St. Elias mount, i. 111; ii. 452
St. Francis lake, ii. 335
river, i. 23; ii. 367

St. George, Utah, i. 125
bay, ii. 297
island, i. 279
St. George's bay, ii. 626
St. Helène island, ii. 358
St. Helen's island, ii. 588
St. Helen's mount, i. 111
St. John, New Brunswick, ii. 583
lake, ii. 338, 366
river, ii. 582
St. John's, Newfoundland, ii. 634
harbour, ii. 634
population, ii. 635
trade, ii. 634
St. Lawrence basin, ii. 291
gulf, ii. 297, 362
gulf and river products, ii. 457
St. Lawrence river, i. 32, 38; ii. 351
or Detroit, ii. 352
or Niagara, ii. 351, 353
or St. Clair, ii. 352
or Sault St. Marie, ii. 352
islands in, ii. 361
lakes and rapids, ii. 357
length of, ii. 350
"traverse" of the, ii. 360
valley of the, i. 6
width of, ii. 360, 585
St. Louis, i. 196
Germans in, i. 207
population, i. 181
tubular bridge, i. 198
St. Marie river, i. 33
St. Martin's, Montreal, table of a year's temperature, ii. 455
St. Maurice river, ii. 365
St. Mary's bay, ii. 295, 626
St. Paul, bay of, ii. 360
St. Paul island, i. 279
St. Peter bay, ii. 296
St. Regis lake, ii. 357
St. Ronan's mountain, ii. 334
Salisbury island, ii. 302
Salmon river ranges, i. 81
Salt Lake, i. 132
deposits, i. 27
mines of Louisiana, i. 31
statistics of, ii. 503
valley, i. 105, 125
Sandusky river, ii. 370
Sangre de Cristo range, i. 85
Saguenay river, ii. 336, 361, 366
San Francisco, i. 199
bay, i. 120
climate, i. 201
or "Golden City," i. 200
Golden Gate, i. 201
inhabitants, i. 202
mountains, i. 130
population, i. 181
San Joaquin valley, i. 121
San Juan range, i. 90
river, i. 92
San Lucas cape, i. 160
San Luis valley, i. 87
Sanpere, Mr., ii. 476
Sarnia, ii. 548
Saskatchewan, district of, ii. 290
river, ii. 294, 348, 350, 391, 392, 397, 398
Great, ii. 416
Little, ii. 416
(North), ii. 408
(South), ii. 395, 397
valley temperature, ii. 462
"Sautteux" Indians, ii. 568
Savage islands, ii. 302, 311
Sawatch or "Sierra Madre" range, i. 89
Scratching creek, ii. 422
Seal-fishing, i. 281
Seal river, ii. 305
island, ii. 410
Selkirk, Lord, treaty with Indians, ii. 564
mountains, ii. 343
range, mountains, ii. 442
Selwyn, A. R. C., F.R.S., F.G.S., account of Hudson bay by, ii. 301
Semi-tropical regions, i. 25
Seton lake, ii. 443, 444
Severn river, ii. 305
Sevier river, i. 105
Shakers, history of the, i. 248
Shasta mount, i. 111, 113
Shavano mount, i. 89
Shebandowan lake, ii. 347
Shenandoah valley, i. 6
Shepherdia argentea, ii. 400
Sherman peak, i. 112
Shickshock mountains, ii. 333
Shipping statistics, ii. 529
Shoal lake, ii. 349
Shoshonees Indians or Snake tribe, ii. 569
Shuswap lake, ii. 447
Shushwap lakes, Great and Little, ii. 443
Sierra, the—
"Big Trees" of, i. 123
vegetation of, i. 122
Sierra Abajo, i. 130
Blanca, i. 85
Carriso, i. 130
el Laté, i. 130
Magdalena, i. 90
Mateo, i. 90
de las Mimbres, i. 90
Nevada, i. 116, 133
la Sal, i. 130
Silver, a year's product, i. 137
table of production of, i. 150
Silver in—
Clear Creek county, i. 157
Colorado, i. 149, 157
the Cordilleras, i. 149
Georgetown, i. 157
Idaho, i. 156
Lake Superior, ii. 504
Silver in—
Leadville, i. 158
Nevada, i. 149
San Juan, i. 157
Summit county, i. 157
Utah, i. 149, 156
Virginia, i. 151
Similkameen river, ii. 438
Simpson cape, ii. 321
lake, ii. 435
Sir George, ii. 558, 598
Siniahmoo bay, ii. 445
Sioux Indians, ii. 559, 563
home of, i. 82
Sipi-wesk lake, ii. 414
Sitka, mean temperature, ii. 471
"Sitting Bull," Indian, ii. 563
Skeena river, ii. 437, 448, 475
Slave lake, Lesser, ii. 430
river, Lesser, ii. 430
Slavery, abolition of, i. 176
introduced, i. 171
Smith sound, timber and game at, ii. 323
Smoky river, ii. 435
vegetation, ii. 479
Smoky, Great, mountains, i. 7
Snake river, i. 79
or "Mad" river, i. 80
Shoshone, fall on, i. 80
plains, i. 81
Snowyland islands, ii. 303
Social relations in America, i. 239
Soda lake, i. 109
Sohauptues Indians, ii. 569
Sorel, ii. 358
Sounds—
Cumberland, ii. 322
Erskine, ii. 320
Lancaster, ii. 322
Long island, ii. 305
Manitounuck, ii. 306
Smith, ii. 323
Souris river, ii. 290
Southampton island, ii, 303
South bay, ii. 375
South Carolina, ores in, i. 13
South park, i. 84, 86
South Platte river, i. 128
South Saskatchewan river, ii. 290
Southern Southampton islands, ii. 302
Southern States, blacks in, i. 209
whites in, i. 209
Spanish peaks, i. 85
Spear cape, ii. 634
Spence's bridge, ii. 447
Spokans Indians, ii. 569
Spy hill, ii. 397
Stickeen river, ii. 437
Stone river, ii. 433
or Porcupine river, ii. 434
Straits—
Belle Isle, ii. 297
Bellot, ii. 320, 323
Dease, ii. 321

Straits—
Dolphin and Union, ii. 321
Fox channel, ii. 321
Franklin, ii. 321
of Fuca, or Juan de Fuca, ii. 325, 600
of Georgia, ii. 441
Hecla and Fury, ii. 322
Hudson, ii. 301
of Mackinaw or Michihilimacinac, ii, 371, 372
St. Mary or Sault St. Marie, ii. 373
Victoria, ii. 321, 323
Struthiopteris Germanica, ii. 400
Stuart lake, ii. 446
river, ii. 441
Sturgeon lake, ii. 480
Sugar Loaf peak, ii. 334
Sumass river, ii. 445
Superior lake, i. 32, 33, 39; ii. 350, 372, 504
products, ii. 461
scenery, ii. 548
silver mines, ii. 374
temperature, ii. 461
Suskwa river, ii. 450
valley, ii. 475
Sussex co., ores in, i. 12
Sutton mountain, ii. 334
Swan river, ii. 417
Swedes, the, i. 206
Sweetwater range, i. 42
river, i. 82
valley, i. 82
Swiss, the, i. 206

TACLA lake, ii. 441, 446
Tadousac, ii. 366
Tahaurus or Marcy mount, i. 7
Tchesinkut lake, ii. 446
Tecumseh, ii. 563
Tejon pass, i. 116
Temagamang lake, ii. 338
Temis-camang lake, ii. 338, 363
Temiscouata lake, ii. 335
Tennessee, ores in, i. 13
river, i. 24
Terra Nova river, ii. 626
Tête Jaune Cache, ii. 438
Tezzer lake, ii. 446
Thompson, David, ii. 392
river, ii. 349, 442
North, river, ii. 442
South, river, ii. 443
"Thousand Islands," the, ii. 356, 549
"Three Buttes" mountains, i. 81
Three Rivers, ii. 359
Thunder bay temperature, ii. 461
Thunder-breeding mountain, ii. 396
Timpanogos or Provo river, i. 104
Toledo, i. 196
Tolmie mount, ii. 600
Tongue river, i. 82
Toronto, ii. 369, 547, 596
bay, ii. 596
history, ii. 597
population, ii. 597
rainfall at, ii. 467
temperature, ii. 596
university, ii. 596
or York, ii. 596
Tory island, ii. 305
Touchwood hills, ii. 290, 397, 405
Tourmente cape, ii. 457
"Traverse," the, ii. 360
Trees, habitat of various, ii. 307
Trent river, ii. 369
Tributaries, secondary, of Mississippi, i. 23
Trinity bay, ii. 625
Trout river, ii. 305
Tunnel, Mount Hoosac, i. 269
Tunnel, Sutro silver-mine, i. 155
Turtle portage, ii. 424

UINTA range, i. 42, 96
basin, i. 96
river, i. 92
valley, i. 97
Ungava, bay of, ii. 302
Esquimaux near, ii. 303
tides in, ii. 303
Union restored, i. 176
spread of the, i. 170
United States—
agricultural products, i. 171
agriculture, i. 261
boundaries, i. 179
canals, i. 267
cattle-breeding, i. 264
Civil war, the, i. 170
"colonial produce," i. 263
confederation formed, i. 168
expenditure, i. 274
Federal Union of the, i. 169
fleet, i. 275
historical survey, i. 162
industrial collapse in, i. 177
land forces, i. 274
Northern free, i. 174
number, i. 179
population, i. 179, 180
railway system, i. 268
revenue, i. 274
Southern slave, i. 174
timber, i. 265
wheat products, i. 261
wine and tobacco, i. 263
Upper Savage islands, ii. 311
Utah, gold and silver in, i. 136
silver first called lead in Utah, i. 156

VANCOUVER, explorations by, ii. 324
Vancouver island, ii. 325
coal in, ii. 295, 326
discovery of, ii. 324
timber, ii. 325
Vermilion river, ii. 435
Vermont, marble in, i. 14
range, i. 6
Viburnum Lentago, ii. 400
pubescens, ii. 401
Victoria, British Columbia, ii. 600
climate, ii. 601
docks, ii. 601
lake, ii. 477
strait, ii. 321, 323
"west of sunset," ii. 601
and Albert land, ii. 328
Virgen river, i. 92
Virginia city, i. 153
climate, ii. 459
colony founded in, by Sir Walter Raleigh, i. 165
ores in, i. 13, 15
tobacco in, i. 164
Vitis riparia, ii. 400

WABASH river, i. 24
Wager inlet, ii. 303
Wahsatch range, i. 103
Walsingham cape, ii. 322
Washington, i. 191, 195
Capitol, i. 192
charitable institutions, i. 194
education, i. 195
George, i. 168
gold and silver in, i. 136
mount, i. 6
population, i. 181
public buildings, i. 192
White House, i. 194
Waterhen river, ii. 418
Waterways of Canada, 346-50
Wat-son-kua river, ii. 449, 475
Weber river, i. 104
Weenisk river, ii. 305
Welland canal, ii. 369
Westminster, New, ii. 437, 445, 602
Wet or Greenhorn mountains, i. 85
Whale river, ii. 303
Whale, Little, river, ii. 305
Wheat in Illinois, ii. 487
Iowa, ii. 487
Kansas, ii. 487
Manitoba, ii. 486
Minnesota, ii. 488
Peace River region, ii. 488
Red River valley, ii. 487
Saskatchewan region, ii. 487
Texas, ii. 487
Wisconsin, ii. 487
Wheat markets, tables, ii. 485, 486

Wheat markets—
Buffalo, ii. 486
Chicago, ii. 485
Duluth, ii. 485
Wheelock, J. A., ii. 464, 468
Whirlpool river, ii. 430
Whiskey-Jack "mountain," ii. 415
White-fish lake, ii. 424
White mountains, i. 6
of Coleraine, ii. 334
White Mountain springs, i. 63
White bay, ii. 625
river, i. 24, 92
Whitney mount, i. 133
Willamette valley, i. 120
William's Fork river, i. 92
Williamsville, ii. 595
Willis, N. P., account of Niagara falls, ii. 353
Wind river, i. 78
mountains, i. 78
valley, i. 82
Windsor, ii. 369
Windsor, Ontario, table of mean temperature, ii. 461
Winnipeg, Manitoba, ii. 421, 598
appearance, ii. 600
Winnipeg, Manitoba—
confluence of Red river and Assiniboine, ii. 348
country about, ii. 419
education, ii. 599
or Fort Garry, ii. 598
history, ii. 598
lake, ii. 348, 350, 416, 422
mouth of Saskatchewan, ii. 348
population, ii. 599
rainfall at, ii. 467
river, ii. 418
Winnipegosis lake, ii. 350
Wisconsin river, i. 24
Wolfe island, ii. 356, 594
Wolfville, mean temperature, ii. 462
Wolstenholme cape, ii. 302
Woods, Lake of the, i. 33; ii. 422
or Clearwater lake, ii. 423
or Lake of the Sandhills, ii. 424
islands of, ii. 423
Woodstock, New Brunswick, ii. 583
Woolaston lake, ii. 434
"Wyoming, Gertrude of," ii. 563
YALE, ii. 444
mount, i. 89
Yampa river, i. 92
Yazoo river, i. 23
Yellowhead lake, ii. 441
Yellowhead or Leather mountains, ii. 429
Yellowstone lake, i. 72
geology, i. 76
Grand cañon and falls, i. 72
National park, i. 59
ranges, i. 78
river, i. 23, 72
valley, hot springs in, i. 61, 71
Yosemite valley, i. 117
falls, i. 119
York Factory, coast near, ii. 307
Yucca, or Spanish bayonet, i. 46, 50
Yukon river, i. 277; ii. 451
ZOAR Mission, ii. 567
Zuni mountains, i. 90

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27. **Ceylon.**
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